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Indexed Bibliography of the Eggs and Young of Tunas and Other Scombrids (Pisces, Scombridae), 1880-1970

WILLIAM J. RICHARDS and WITOLD L. KLAWE

ATTLE, WA
mber 1972

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612. The Trade Wind Zone Oceanography Pilot Stud Part VIII: Sea-level meteorological properti and heat exchange processes, July 1963 to Jun 1965. By Gunter R. Seckel. June 1970, iv + 129 pp., 6 figs., 8 tables.

613. Sea-bottom photographs and macrobenthos co lections from the Continental Shelf off Massachusetts. By Roland L. Wigley and Roger B. Theroux. August 1970, iii + 12 pp., 8 figs., 2 tables.

614. A sled-mounted suction sampler for benthic o ganisms. By Donald M. Allen and J. Harold Hudson. August 1970, iii + 5 pp., 5 figs., 1 table.

615. Distribution of fishing effort and catches of skip jack tuna, *Katsuwonus pelamis*, in Hawaiian waters, by quarters of the year, 1948-65. By Richard N. Uchida. June 1970, iv + 37 pp., 6 figs., 22 tables.

616. Effect of quality of the spawning bed on growt and development of pink salmon embryos and alevins. By Ralph A. Wells and William J. McNeil. August 1970, iii + 6 pp., 4 tables.

617. Fur seal investigations, 1968. By NMFS, Marine Mammal Biological Laboratory. December 1970, iii + 69 pp., 68 tables.

618. Spawning areas and abundance of steelhea trout and coho, sockeye, and chum salmon i the Columbia River Basin - past and present. By Leonard A. Fulton. December 1970, iii + 37 pp., 6 figs., 11 maps, 9 tables.

619. Macrozooplankton and small nekton in th coastal waters off Vancouver Island (Canada) and Washington, spring and fall of 1963. By Donald S. Day, January 1971, iii + 94 pp., 1 figs., 13 tables.

620. The Trade Wind Zone Oceanography Pilot Study. Part IX: The sea-level wind field and wind stress values, July 1963 to June 1965. By Gunter R Seckel. June 1970, iii + 66 pp., 5 figs.

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U.S. DEPARTMENT OF COMMERCE
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NOAA Technical Report NMFS SSRF-652

Indexed Bibliography of the Eggs and Young of Tunas and Other Scombrids (Pisces, Scombridae), 1880-1970

WILLIAM J. RICHARDS and WITOLD L. KLAWE

BIBLIOGRAFIA CATALOGADA DE LOS HUEVOS Y ATUNES JOVENES Y DE OTROS ESCOMBRIDOS (PISCES, SCOMBRIDAE), 1880-1970

INDEX BIBLIOGRAPHIQUE SUR LES OEUFS ET FORMES JUVENILES DES THONS ET AUTRES POISSONS DE LA FAMILLE DES SCOMBRIDAE (PISCES, SCOMBRIDAE), 1880-1970

EIN BIBLIOGRAPHISCHES VERZEICHNIS DER ARBEITEN ÜBER DIE EIER UND JUGENDSTADIEN VON THUNFISCHEN UND ANDEREN SCOMBRIDEN (PISCES, SCOMBRIDAE), 1880-1970

SEATTLE, WA
September 1972

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Indexed Bibliography of the Eggs and Young of Tunas and Other Scombrids (Pisces, Scombridae), 1880-1970.[1]

by

WILLIAM J. RICHARDS[2] and WITOLD L. KLAWE[3]

ABSTRACT

This bibliography enumerates reports on the early life history of tunas and other scombrid fishes published before 1971. All the entries are indexed, usually by species, but on occasion by a larger taxonomic unit, and within each taxonomic unit the entries are indexed by one or more subjects.

INTRODUCTION

This bibliography is a compilation of references on the early life history of scombrid fishes, particularly tunas, designed to facilitate the retrieval of printed information on the subject, particularly the (i) identification of eggs, larvae, and juveniles, (ii) methods of collection of early life stages, (iii) distribution and abundance, and (iv) ecology and general biology of all these stages. As our compilation of the bibliographical entries terminated in December of 1970 it is assumed that most publications printed through 1970 are included in this bibliography. Since our bibliography is restricted to reports pertaining to fertilized eggs, larvae, and juveniles, references dealing exclusively with gonad studies, i.e., ovarian eggs (ova), are excluded from this report. We attempted to cover all the entries pertaining to early life history of all species in the family Scombridae, and we believe that all major works are enumerated in our report. However, in the case of the mackerels of the genus *Scomber*, we limited the entries to what we believe are the more significant reports on this genus. Because of the vastness of the printed material on *Scomber* spp. and our own lack of experience with the genus, we feel that compilation of bibliographical entries pertaining to the early life history of *Scomber* spp. should be left to an expert in that field.

Tunas are a world resource because of their far-ranging migratory habits and because most of them are harvested at high seas by fleets of many nations. Research on tunas further reflects these international aspects, being carried out by scientists from many countries or even from international organizations. We feel, therefore, that it is most appropriate to employ in our bibliography four languages, thus making the publication more accessible to our colleagues from around the world.

INDEXING SYSTEM

This bibliography is divided into three parts. Entries are listed alphabetically by author and chronologically for each author. We have followed the guidelines of Brown and Stratton

[1] Contribution No. 199, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Center, Miami Laboratory, Miami, Florida 33149.

[2] National Marine Fisheries Service, Southeast Fisheries Center, Miami Laboratory, Miami, Florida 33149.

[3] Inter-American Tropical Tuna Commission, Scripps Institution of Oceanography, La Jolla, California 92037.

(1964) and Porter (1968) in listings and abbreviations of the titles of journals. In addition, all junior authors are listed alphabetically with references to their respective papers. To further assist readers in finding cited publications, the second part lists abbreviations and full titles of periodicals.

The subject index comprises the third part of the bibliography. This index is arranged alphabetically by taxa; within each taxon there are three subdivisions—(i) eggs, (ii) larvae, and (iii) juveniles. Each subdivision has four parts—(i) description, (ii) distribution, (iii) collection methods, and (iv) general biology. The description portion includes papers which describe the morphology of the animal; the distribution section includes papers which describe geographic distribution and abundance; the collection method section includes papers which describe methods; and the general biology portion includes papers which discuss biological aspects not covered in the previous sections, i.e., growth, behavior, culture, temperature and salinity tolerances, diurnal movements, etc. Where no references were found it is noted as "no references found."

The taxa employed in the index conform with the most recent systematic reviews available. The systematic reviews which we followed were: Fraser-Brunner (1950); Collette and Gibbs (1963); Gibbs and Collette (1967); and Matsui (1967). The genera and species of the family Scombridae together with the geographical distribution of each of the species are listed in Table 1. For the purpose of indexing, each bibliographical entry was classified according to its respective species whenever feasible. When this was not possible the next highest taxon was used. In the subject index, taxa such as Thunnidae and Katsuwonidae appear because several papers use these taxa and thus they remain convenient for our purposes.

Bibliografía Catalogada de los Huevos y Atunes Jóvenes y de Otros Escombridos (Pisces, Scombridae), 1880-1970[1]

por

WILLIAM J. RICHARDS[2] y WITOLD L. KLAWE[3]

EXTRACTO

Esta bibliografía presenta los trabajos publicados con anterioridad a 1971, de los primeros estadios del ciclo vital de los atunes y de otros peces escómbridos. Todas las anotaciones han sido catalogadas, generalmente por especies, pero en ocasiones mediante una unidad taxonómica mayor, y dentro de cada unidad taxonómica se encuentran las anotaciones indicadas por uno o más sujetos.

INTRODUCCION

Esta bibliografía es una compilación de referencias sobre los primeros estadios del ciclo vital de los peces escómbridos, especialmente los atunes; concebida para poder recobrar la información publicada sobre este sujeto, especialmente (i) la identificación de los huevos, larvas y juveniles, (ii) métodos de recolección de los primeros estadios del ciclo vital, (iii) distribución, abundacia, (iv) ecología y biología general de todas estas fases. Como la compilación de estas anotaciones bibliográficas fue terminada en diciembre 1970, se considera que la mayoría de las publicaciones impresas hasta esa fecha se encuentran incluidas en esta bibliografía. En vista de que nuestra bibliografía se encuentra limitada a informes referentes a huevos fertilizados, larvas y juveniles, las referencias que tratan exclusivamente de los estudios de las gónadas, es decir, óvulos, se excluyen en este informe. Hemos intentado abarcar todas las anotaciones referentes a los primeros estadios del ciclo vital de todas las especies de la familia Scombridae y, creemos, que se han enumerado todos los trabajos principales en nuestro informe. Sin embargo, en el caso de las caballas del género *Scomber*, limitamos las anotaciones a lo que creemos son los informes más representativos en este género. A causa de la gran cantidad de material impreso en *Scomber* spp. y a nuestra propia falta de experiencia con este género, nos parece que la compilación de anotaciones bibliográficas referentes a los primeros estadios del ciclo vital de *Scomber* spp. debe encomendarse a un experto en este ramo.

Los atunes son un recurso mundial debido a sus hábitos migratorios a grandes distancias, y a causa de que la mayoría de ellos son capturados en alta mar por las flotas de muchas naciones. La investigación sobre los atunes refleja aún más estos aspectos internacionales, siendo realizada por científicos de varios países o aún por organizaciones internacionales. Creemos, por lo tanto, que lo más apropiado es emplear cuatro idiomas en nuestra bibliografía, facilitando así para que la publicación

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[2] National Marine Fisheries Service, Southeast Fisheries Center, Miami Laboratory, Miami, Florida 33149.

[3] Comisión Interamericana del Atún Tropical, Scripps Institution of Oceanography, La Jolla, California 92037.

sea más accessible a nuestros colegas en todo el mundo.

SISTEMA CATALOGADOR

Esta bibliografía está dividida en tres partes. Las anotaciones se encuentran enumeradas alfabéticamente por autor y cronológicamente por cada autor. Hemos seguido las normas de Brown y Stratton (1964) y Porter (1968) en la enumeración y en la abreviatura de los títulos de las publicaciones científicas. Además, todos los autores secundarios se encuentran enumerados alfabéticamente con referencia a sus respectivos trabajos. Con el fin de ayudar a los lectores a encontrar las publicaciones citadas, en la segunda parte se enumeran las abreviaturas y títulos completos de los artículos que se encuentran en las revistas científicas.

La tabla de materias forma la tercera parte de la bibliografía. El índice está arreglado alfabéticamente por taxones; cada taxon tiene tres subdivisiones—(i) huevos, (ii) larvas, e (iii) juveniles. Cada una de estas subdivisiones tiene cuatro partes—(i) descripción, (ii) distribución, (iii) métodos de recolección y (iv) biología general. La parte descriptiva incluye artículos que describen la morfología del animal; la sección de distribución comprende artículos que describen la distribución geográfica y abundancia; la sección de los métodos de recolección contiene disertaciones en las que se describen los métodos; y la parte de la biología general comprende estudios en los que se discuten los aspectos biológicos que no se encuentran incluidos en secciones anteriores, es decir, crecimiento, comportamiento, cultura, tolerancia a la temperatura y salinidad, movimientos diurnos, etc. Se anotó "no references found" donde no se encontraron referencias.

Los taxones empleados en el índice están de acuerdo a las revisiones sistemáticas utilizadas recientemente. Las revisiones sistemáticas adoptadas fueron: Fraser-Brunner (1950); Collette y Gibbs (1963); Gibbs y Collette (1967) y Matsui (1967). Los géneros y especies de la familia Scombridae, junto con la distribución geográfica de cada una de ellas, se enumeran en la Tabla 1. Cuantas veces fue posible, cada entrada bibliográfica fue catalogada para su clasificación de acuerdo a su respectiva especie. Cuando no lo fue, se empleó el taxon mayor que le seguía. En la tabla de materias, aparecen tales taxones como Thunnidae y Katsuwonidae, ya que varios estudios los han empleado y, por lo tanto, son convenientes para nuestros fines.

Index Bibliographique sur les Oeufs et Formes Juveniles des Thons et Autres Poissons de la Famille des Scombridae (Pisces, Scombridae) 1880-1970[1]

par

WILLIAM J. RICHARDS et WITOLD L. KLAWE[2]

SOMMAIRE

Cette bibliographie énumère les publications qui ont été publiées avant l'année 1971 sur la vie larvaire des thons et autres poissons de la famille des scombridae. Tous les travaux enregistrés figurent à l'index, généralement au niveau de l'espèce, mais parfois au niveau d'une unité taxonomique plus élevée; à l'intérieur de chaque unité taxonomique, les travaux figurent à l'index par thèmes séparés ou groupés.

INTRODUCTION

Cette bibliographie groupe les travaux de références sur la vie larvaire des poissons de la famille des scombridae, en particulier des thons. Elle est destinée à faciliter la recherche des informations, spécialement sur (i) l'identifications des oeufs, larves et juvéniles, (ii) les méthodes de récolte des stades larvaires, (iii) la distribution, l'abondance, (iv) l'écologie et la biologie des scombridés à ces différents stades. Ce travail ayant été terminé en décembre 1970, nous supposons que la plupart des publications parues en 1970 y sont inclues. Comme nous nous sommes limités à l'étude des oeufs fécondés, larves et juvéniles, les travaux concernant exclusivement les études sur les gonades, [c.à.d. les oeufs ovariens, (ova)], ne paraissent pas dans cet ouvrage bibliographique. Nous avons tenté d'englober tous les sujets se rapportant à la vie larvaires de toutes les espèces de la famille des scombridae et nous pensons avoir donné ici un énumération des principaux travaux. Cependant, en ce qui concerne les maquereaux du genre *Scomber*, nous nous sommes limités aux publications qui nous on paru être les plus importantes sur ce genre. En raison de l'ampleur de la documentation sur *Scomber* spp. et de notre manque d'expérience concernant ce genre particulier, il nous semble qu'une bibliographie relative à la vie larvaire de *Scomber* spp. devrait être laissée aux soins d'un expert en la matière.

Les thons sont une ressource mondiale en raison de l'amplitude de leurs migrations et du fait qu'ils sont pour la plupart pêchés en haute mer, par les flottes de nombreuses nations. Les recherches sur les thons reflètent également ces aspects internationaux, car elles sont poursuivies par des chercheurs appartenant à beaucoup de pays ou même à des organisations internationales. Nous pensons donc qu'il y a lieu

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[3] Inter-American Tropical Tuna Commission, Scripps Institution of Oceanography, La Jolla, California 92037.

d'employer quatre langues dans notre bibliographie, de manière à en faciliter l'accès à nos collègues des diverses parties du monde.

PRESENTATION DE L'INDEX BIBLIOGRAPHIQUE

Cette bibliographie est divisée en trois parties. Les travaux sont d'abord présentés dans l'ordre alphabétique des auteurs et dans l'ordre chronologique pour chaque auteur. Nous nous sommes conformés aux règles de Brown et Stratton (1964) et de Porter (1968) pour la présentation et les abréviations des titres de revues. De plus, tous les auteurs récents sont énumérés dans l'ordre alphabétique avec les références de leurs travaux respectifs. Afin d'apporter aux lecteurs une aide supplémentaire dans la recherche des publications citées, la seconde partie donne une liste des titres complets des périodiques et de leurs abréviations.

La troisième partie de la bibliographie est une table des matières. Elle est agencée alphabétiquement par taxa; il y a trois subdivisions pour chaque taxon—(i) oeufs, (ii) larves et (iii) juvéniles. Chaque subdivision comporte quatre parties—(i) description, (ii) distribution, (iii) méthodes de récolte et (iv) biologie générale. La partie "description" comprend les travaux décrivant la morphologie de l'animal; la partie "distribution" concerne les travaux sur la distribution géographique et l'abondance; la partie "méthodes de récolte" inclus les travaux qui décrivient les techniques de capture; enfin la partie "biologie générale" comprend les travaux traitant les aspects biologiques non compris dans les sections précédentes, c.à.d. croissance, comportement, culture, tolérances à la température et à la salinité, déplacements diurnes, etc. . . Lorsqu'aucune référence n'a pu être trouvée, ceci est indiqué par la mention "no references found".

Les taxa utilisés dans l'index sont conformes aux plus récentes revues de systématique disponibles. Les revues de systématique sur lesquelles nous nous sommes basés sont de Fraser-Brunner (1950), Collette et Gibbs (1963), Gibbs et Collette (1967) et Matsui (1967). Les genres et espèces de la famille des scombridae ainsi que la distribution géographique de chacune des espèces sont énoncés dans le Tableau 1. Pour suivre l'index, chaque référence bibliographique a été classée selon l'espèce respective toutes les fois que cela a été possible. Lorsque ceci n'a pu être réalisé, le taxon immédiatement supérieur a été utilisé. Dans la table de matières, apparaissent des taxa tels que Thunnidae et Katsuwonidae. Cette séparation faite par de nombraux auteurs semble donc logique dans ce travail.

Ein Bibliographisches Verzeichnis der Arbeiten über die Eier und Jugendstadien von Thunfischen und anderen Scombriden (Pisces, Scombridae), 1880-1970.[1]

von

WILLIAM J. RICHARDS[2] und WITOLD L. KLAWE[3]

KURZFASSUNG

Die Berichte, die in der Bibliographie verzeichnet sind, behandeln die Jugendstadien der Thunfische und anderer Scombriden und sind vor 1971 veröffentlicht worden. Die meisten Eintragungen sind nach den Arten verzeichnet, manchmal jedoch wurden höhere taxonomische Einheiten zum katalogisieren benützt. Die Eintragungen innerhalb jeder taxonomischen Einheit sind dann wiederum nach einem oder mehreren Gegenständen verzeichnet.

EINLEITUNG

Die Bibliographie führt eine Ansammlung von Arbeiten an, die die Jugendstadien von Scombriden, insbesondere von Thunfischen, behandelt. Zweck der Bibliographie ist es, das Auffinden von gedruckter Kenntnis des Gegenstandes zu ermöglichen, insbesondere die (I) Feststellung der Eier, Larven und Jugendstadien, (II) Fangmethoden von Larven und Jugendstadien, (III) Verbreitung und Häufigkeit des Vorkommens und (IV) Ökologie und allgemeine Biologie dieser Lebensstadien. Die Ansammlung des bibliographischen Materials endete im Dezember 1970. Wir nehmen an, dass fast alle Werke, die bis zum Ende von 1970 gedruckt worden sind, hier in dieser Bibliographie eingetragen sind. Werke, die ausschliesslich Gonaden behandeln, d.h. Eier der Ovarien, sind in diese Bibliographie nicht mit einbezogen worden, da wir uns auf Werke beschränkt haben die befruchtete Eier, Larven und Jugendstadien behandeln. Wir haben versucht, alle Veröffentlichungen, die die frühen Lebensstadien aller Arten der Familie Scombridae betreffen, einzuschliessen, und wir glauben, dass alle hauptsächlichen Arbeiten in unserer Bibliographie verzeichnet sind. Wir beschränkten uns jedoch bei der Aufführung der Makrelen der Gattung *Scomber* auf die Eintragung der wichtigeren Hauptwerke, weil wir nur wenig Erfahrung mit dieser Gattung haben und weil das gedruckte Material über *Scomber* spp. zu umfangreich ist. Nach unserer Meinung sollte nur ein Fachmann auf dem Gebiet der Jugendstadien von *Scomber* spp. die Zusammentragung des bibliographischen Materiales übernehmen.

Thunfische sind eine Weltnahrungsquelle wegen ihrer weitreichenden Wanderungsgewohnheiten und auch weil die meisten Arten

[1] Beitrag Nummer: 199, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Center, Miami Laboratory, Miami, Florida 33149.

[2] National Marine Fisheries Service, Southeast Fisheries Center, Miami Laboratory, Florida 33149.

[3] Inter-American Tropical Tuna Commission, Scripps Institution of Oceanography, La Jolla, California 92037.

auf Hochsee von Flotten vieler Nationen eingebracht werden. Thunfischforschung reflektiert auch diese internationalen Aspekte, da sie von Forschern vieler Länder, und sogar von internationalen Organisationen ausgeführt wird. Wir halten es daher für angebracht in unserer Bibliographie vier Sprachen anzuwenden um unseren Kollegen in der ganzen Welt die Zugänglichkeit der Publikation zu erleichtern.

VERZEICHNUNGSSYSTEM

Die Bibliographie besteht aus drei Teilen. Die Eintragungen wurden alphabetisch nach dem Verfasser verzeichnet und sind dann für jeden Verfasser zeitlich geordnet. Wir folgten den Richtlinien von Brown und Stratton (1964) und Porter (1968) zum Verzeichnen und Abkürzen der Namen von Zeitschriften. Alle Mitverfasser sind zusätzlich alphabetisch mit ihren Arbeiten angeordnet. Um dem Leser noch weiterhin behilflich zu sein, zitierte Veröffentlichungen zu finden, sind im zweiten Teil die Abkürzungen und die unabgekürzten Namen der Zeitschriften verzeichnet.

Das Sachverzeichnis umfasst den dritten Teil der Bibliographie. Es ist alphabetisch nach den Taxa angelegt. Unter jedem Taxon sind dann drei Unterteilungen—(I) Eier, (II) Larven, (III) Jugendstadien. Jede der drei Unterteilungen hat dann vier Teile—(I) Beschreibung, (II) Verbreitung, (III) Fangmethoden und (IV) allgemeine Biologie. Der Teil unter "Beschreibung" enthält die Arbeiten, die die Morphologie des Tieres beschreiben; der Teil unter "Verbreitung" enthält die Arbeiten, die die geographische Verbreitung und Häufigkeit des Vorkommens behandeln. Der "Fangmethoden" Teil enthält Arbeiten, in denen die Methoden des Fanges beschrieben werden; in dem Teil "allgemeine Biologie" sind die Arbeiten enthalten, die die biologischen Aspekte behandeln, die in den vorhergehenden Teilen nicht erwähnt wurden, wie zum Beispiel Wachstum, Tierpsychologie, Fischkultur, Temperatur und Salzgehalt Toleranzen, tägliche Standortveränderungen u.s.w. Wo Referenzen nicht vorhanden waren, wurde es als "no references found" notiert.

Die Taxa im Sachverzeichnis entsprechen den neuesten anliegenden systematischen Arbeiten. Wir richteten uns nach den folgenden systematischen Arbeiten: Fraser-Brunner (1950), Collette und Gibbs (1963), Gibbs und Collette (1967) und Matsui (1967). Die Gattungen und Arten der Familie Scombridae sind zusammen mit der geographischen Verteilung der Arten in Tabelle 1 aufgeführt. Nach Möglichkeit wurden die bibliographischen Angaben nach den jeweiligen betrefflichen Arten gemacht. Wenn dies jedoch nicht möglich war, wurde das nächsthöhere Taxon verwendet. Die Taxa Thunnidae und Katsuwonidae treten im Sachverzeichnis auf, weil sie in mehreren Arbeiten vorkommen.

TABLE 1. List of genera and species of the family Scombridae and the geographical distribution of each species.*

TABLA 1. Lista de géneros y especies de la familia Scombridae y de la distribución geográfica de cada especie.*

TABLEAU 1. Liste des genres et espèces de la famille des Scombridae et distribution géographique de chaque espèce.*

TABELLE 1. Eine Liste der Gattungen und Arten der Familie Scombridae und die geographische Verteilung jeder Art.*

ACANTHOCYBIUM Gill, 1862

Acanthocybium solandri (Cuvier *in* Cuvier and Valenciennes, 1831)

Tropical and subtropical waters of the Indo-Pacific and Atlantic Oceans including the Mediterranean Sea.

Aguas tropicales y subtropicales de los océanos Indico, Pacífico y Atlántico, incluyendo el Mar Mediterráneo.

Eaux tropicales et subtropicales des Océans Indien, Pacifique et Atlantique, y compris la Mer Méditerranée.

Tropische und subtropische Gewässer des Indischen, Pazifischen und Atlantischen Ozeans einschliesslich des Mittelmeeres.

ALLOTHUNNUS Serventy, 1948

Allothunnus fallai Serventy, 1948

Southern regions of the Indo-Pacific and Atlantic oceans; sporadic in the eastern Pacific Ocean.

Regiones meridionales de los océanos Indico, Pacífico y Atlántico; esporádicamente en el Océano Pacífico oriental.

Régions méridionales des océans Indien, Pacifique et Atlantique; sporadiquement dans l'Océan Pacifique oriental.

Südliche Bereiche des Indischen Pazifischen und Atlantischen Ozeans, sporadisches Auftreten im Ost-Pazifischen Ozean.

AUXIS Cuvier, 1829

Auxis rochei (Risso, 1810)

Tropical and subtropical waters of the Indo-Pacific and Atlantic oceans, including the Mediterranean Sea.

Aguas tropicales y subtropicales de los océanos Indico, Pacífico y Atlántico, incluyendo el Mar Mediterráneo.

Eaux tropicales et subtropicales des océans Indien, Pacifique et Atlantique, y compris la Mer Méditerranée.

Tropische und subtropische Gewässer des Indischen, Pazifischen und Atlantischen Ozeans, einschliesslich des Mittelmeeres.

Auxis thazard (Lacépède, 1800)

Tropical and subtropical waters of the Indo-Pacific and Atlantic oceans.

Aguas tropicales y subtropicales de los océanos Indico, Pacífico y Atlántico.

Eaux tropicales et subtropicales des océans Indien, Pacifique et Atlantique.

Tropische und subtropische Gewässer des Indischen, Pazifischen und Atlantischen Ozeans.

CYBIOSARDA Whitley, 1935

Cybiosarda elegans (Whitley, 1935)

* We have excluded *Gasterochisma melampus* Richardson, a species which is occasionally included in the family Scombridae.

Excluimos *Gasterochisma melampus* Richardson, especie que ocasionalmente se incluye en la familia Scombridae.

Nous avons exclu *Gasterochisma melampus* Richardson, espèce occasionnellement comprise dans la famille des Scombridae.

Wir haben *Gasterochisma melampus* Richardson nicht mit eingeschlossen. Diese Art wird hin und wieder in der Familie Scombridae mit eingeschlossen.

Coasts of Australia.

Costas de Australia.

Côtes de l'Australie.

An den Küsten von Australien.

EUTHYNNUS Lütken *in* Jordan and Gilbert, 1883

Euthynnus affinis (Cantor, 1849)

Warm and tropical waters of the Indo-Pacific Ocean, sporadic in the eastern Pacific Ocean.

Aguas cálidas y tropicales de los océanos Indico y Pacífico, esporádicamente en el Océano Pacífico oriental

Eaux chaudes et tropicales des Océans Indien et Pacifique; sporadiquement dans l'Ocean Pacifique Oriental.

Warme und tropische Gewässer des Indischen und Pazifischen Ozeans, sporadisches Auftreten im östlichen Pazifischen Ozean.

Euthynnus alletteratus (Rafinesque, 1810)

Warm and tropical waters of the Atlantic Ocean including the Mediterranean Sea. Sporadic occurrence in the Black Sea.

Aguas cálidas y tropicales del Océano Atlántico incluyendo el Mar Mediterráneo. Aparición esporádica en el Mar Negro.

Eaux Chaudes et tropicales de l'Océan Atlantique, y compris la Mer Méditerranée. Apparition sporadique dans la Mer Noire.

Warme und tropische Gewässer des Atlantischen Ozeans einschliesslich des Mittelmeeres, sporadisches Vorkommen im Schwarzen Meere.

Euthynnus lineatus Kishinouye, 1920

Warm and tropical waters of the eastern Pacific Ocean; stray specimen recorded from the central Pacific Ocean.

Aguas cálidas y tropicales del Océano Pacífico oriental; especímenes errantes registrados en el Océano Pacífico central.

Eaux chaudes et tropicales de l'Océan Pacifique oriental; specimens isolés signalés dans l'Océan Pacifique central.

Warme und tropische Gewässer des östlichen Pazifischen Ozeans, vereinzeltes Vorkommen im zentralen Pazifischen Ozean.

GRAMMATORCYNUS Gill, 1862

Grammatorcynus bicarinatus (Quoy and Gaimard, 1824)

Red Sea, absent from the Arabian Sea and Bay of Bengal; present off South East Asia, Australia, Philippines, Ryukus and Marshalls.

Mar Rojo, ausente del Mar Arábico y Golfo de Bengala; presente frente a la costa sudeste de Asia, Australia, Filipinas, Riukius y Marshall.

Mer Rouge, absent dans la Mer d'Oman et le Golfe du Bengale; présent au large de la côte sud de l'Asie orientale, Australie, Philippines, Ryu Kyu et Marshall.

Im Roten Meer, nicht vorkommend im Arabischen Meer und im Golf von Bengalen, vorkommend an der Küste von Südostasien, Australien, der Philippinen, Riukiu-Inseln und Marshall-Inseln.

GYMNOSARDA Gill, 1862

Gymnosarda unicolor (Rüppell, 1838)

Red Sea eastward to Society Islands, Marquesas, Marshalls and Japan.

En el Mar Rojo al este de las Islas Sociedad, Marquesas, Marshall y el Japón.

Dans la Mer Rouge à l'est des Iles de la Société, Marquises Marshall et Japon.

Vom Roten Meer östlich bis zu den Gesellschafts-Inseln, Marquesas-Inseln, Marshall-Inseln und Japan.

KATSUWONUS Kishinouye, 1915

Katsuwonus pelamis (Linnaeus, 1758)

Cosmopolitan in tropical and subtropical seas, absent from the Black Sea.

Cosmopolita en mares tropicales y subtropicales, ausente en el Mar Negro.

Cosmopolite dans les mers tropicales et subtropicales, absent dans la Mer Noire.

Kommt in allen tropischen und subtropischen Meeren vor mit Ausnahme des Schwarzen Meeres.

ORCYNOPSIS Gill, 1862

Orcynopsis unicolor (Geoffroy St. Hilaire, 1809)

West coast of Africa, northward from Dakar, also in the Mediterranean Sea.

Costa occidental del Africa, hacia el norte de Dakar, también en el Mar Mediterráneo.

Côte occidentale de l'Afrique, vers le nord à partir de Dakar, ainsi que dans la Mer Méditerranée.

An der Westküste von Afrika, nördlich von Dakar und auch im Mittelmeer.

RASTRELLIGER Jordan and Starks *in* Jordan and Dickenson, 1908

Rastrelliger brachysoma (Bleeker, 1851)

Malaysia, Indonesia, Solomons and Fiji.

Malasia, Indonesia, Salomones y Fidji.

Malaysia, Indonésie, îles Salomon et Fidji.

Malaysia, Indonesien, Salomon-Inseln und Fidschi-Inseln.

Rastrelliger faughni Matsui, 1967

Philippines, Formosa, and Indonesia.

Filipinas, Formosa e Indonesia.

Philippines, Formose et Indonésie.

Philippinen, Formosa und Indonesien.

Rastrelliger kanagurta (Cuvier, 1817)

East coast of Africa, Seychelles, Arabian Sea, eastward through Indonesia and off northern Australia to Melanesia and Micronesia, coast of People's Republic of China, and Ryukyus. Recent immigrant to the Mediterranean Sea.

Costa oriental del Africa, Seychelles, Mar Arábico, al este hasta Indonesia y frente a Australia septentrional hasta Melanesia y Micronesia, costa de la República Popular de China, y las Riukius. Desplazamiento reciente al Mar Mediterráneo.

Côte orientale de l'Afrique, Seychelles, Mer d'Oman, puis vers l'est en passant par l'Indonésie et au large de l'Australie septentrionale jusqu'en Mélanésie et Micronèsie, Côte de la République Populaire de Chine et Ryu Kyu. Récente immigration vers la Mer Méditerranée.

An der Ostküste von Afrika, Seychellen, Arabisches Meer, dann östlich bis Indonesien und an der Nordküste von Australien bis nach Melanesien und Mikronesien, an der Küste von der Volksrepublik China und den Riukiu-Inseln. Ist vor kurzem in das Mittelmeer eingewandert.

SARDA Cuvier, 1829

Sarda chiliensis (Cuvier *in* Cuvier and Valenciennes, 1831)

Eastern Pacific Ocean, California, Baja California, Peru, Chile but absent from truly tropical waters.

Océano Pacífico oriental, California, Baja California, Perú, Chile, pero ausente en aguas verdaderamente tropicales.

Océan Pacifique oriental, Californie, Basse Californie, Pérou, Chili, mais absent dans les eaux vraiment tropicales.

Im östlichen Pazifischen Ozean, Kalifornien, Nieder Kalifornien, Peru, Chile, nicht vorkommend in wirklich tropischen Gewässern.

Sarda orientalis (Temminck and Schlegel, 1844)

Coastal regions of the Indo-Pacific region, also present around many of the islands. East coast of Africa, Red Sea, Arabian Sea, Gulf of Bengal, western Australia, Indonesia, People's Republic of China, Formosa, Ryukyus, Japan, occasionally in Hawaiian waters. Not abundant in the eastern Pacific. Doubtful reports from the Atlantic Ocean.

Regiones costaneras de la región del Indico y del Pacífico, también presente alrededor de muchas de las islas. En la costa oriental del Africa, Mar Rojo, Mar Arábico, Golfo de Bengala, Australia occidental, Indonesia, República Popular de China, Formosa, Riukiu, Japón, ocasionalmente en aguas hawaianas. No es abundante en el Pacífico oriental. Reportes dudosos del Océano Atlántico.

Régions côtières des pays bordant les océans Indien et Pacifique, ainsi qu'aux alentours d'un grand nombre d'îles. Côte orientale d'Afrique, Mer Rouge, Mer d'Oman, Golfe du Bengale, Australie occidentale, Indonesie, République Populaire de Chine, Formose, Ryu kyu, Japon, parfois dans les eaux hawaiiennes. Peu abondant dans le Pacifique oriental. Présence douteuse dans l'Océan Atlantique.

In den Küstengebieten der Indo-Pazifischen Region und in der Nähe von vielen Inseln. An der Ostküste von Afrika, im Roten Meere, Arabischen Meere, Golf von Bengalen, West-Australien, Indonesien, Volksrepublik China, Formosa, Riukiu-Inseln, Japan, manchmal in den Gewässern der Hawaii-Inseln. Kommt nicht sehr häufig im östlichen Pazifischen Ozean vor. Fragwürdige Berichte des Vorkommens im Atlantischen Ozean.

Sarda sarda (Bloch, 1793)

Atlantic Ocean, Mediterranean and Black Seas.

Océano Atlántico, Mar Mediterráneo y Mar Negro.

Océan Atlantique, Mer Méditerranée et Mer Noire.

Atlantischer Ozean, Mittelmeer, Schwarzes Meer.

SCOMBER Linnaeus, 1758

Scomber australasicus (Cuvier *in* Cuvier and Valenciennes, 1831)

Western Pacific Ocean, off Australia, New Zealand, People's Republic of China, Japan, Ryukyus, Hawaii and Revillagigedos.

Océano Pacífico occidental, frente a Australia, Nueva Zelanda, República Popular de China, Japón, Riukiu, Hawaii y Revillagigedos.

Océan Pacifique Occidental, au large de l'Australie, la Nouvellex-Zélande. République Populaire de Chine, Japon, Ryu Kyu, Hawaii et Revillagigedos.

West-Pazifischer Ozean, Australien, Neuseeland, Volksrepublik China, Japan, Riukiu-Inseln, Hawaii-Inseln, Revillagigedo-Inseln.

Scomber japonicus Houttuyn, 1782

Temperate and warm waters of both hemispheres, present in the Mediterranean Sea.

En aguas templadas y cálidas de ambos hemisferios, presente en el Mar Mediterráneo.

Eaux chaudes et tempérés des deux hémisphères, présent dans la Mer Méditerranée.

In gemässigten und warmen Gewässern beider Hemisphären, kommt im Mittelmeer vor.

Scomber scombrus Linnaeus, 1758

Temperate and near-temperate waters of the Atlantic Ocean including the Mediterranean and the Black Seas.

Aguas templadas y casi templadas del Océano Atlántico, incluyendo el Mar Mediterráneo y el Mar Negro.

Eaux tempérées et semi-tempérées de l'Océan Atlantique comprenant la Mer Méditerranée et la Mer Noire.

In gemässigten und nahezu gemässigten Gewässern des Atlantischen Ozeans einschliesslich des Mittelmeeres und des Schwarzen Meeres.

SCOMBEROMORUS Lacépède, 1802

Scomberomorus cavalla (Cuvier, 1829)

Tropical western Atlantic Ocean.

Océano Atlántico tropical occidental.

Océan Atlantique tropical occidental.

West-tropischer Atlantischer Ozean.

Scomberomorus chinense (Cuvier *in* Cuvier and Valenciennes, 1831)

Western Pacific Ocean, from Vietnam to Japan.

Océano Pacífico occidental, desde Vietnam hasta el Japón.

Océan Pacifique occidental, depuis le Vietnam jusqu'au Japon.

West-Pazifischer Ozean von Vietnam bis Japan.

Scomberomorus commerson (Lacépède, 1800)

Indian and Western Pacific Oceans. Cape Good Hope, east Africa, Red Sea, eastward to Malaysia, Australia, Indonesia, Philippines, People's Republic of China, Formosa and Japan. Recent immigrant to the Mediterranean Sea.

Océanos Indico y del Pacífico occidental. Cabo de la Buena Esperanza, Africa oriental, Mar Rojo, al este de Malasia, Australia, Indonesia, Filipinas, República Popular de China, Formosa y Japón. Desplazamientos recientes al Mar Mediterráneo.

Océans Indien et Pacifique occidental. Cap de Bonne Espérance, Afrique Orientale, Mer Rouge, en direction de l'Est vers la Malaisie, l'Australie, l'Indonésie, les Philippines, la République Populaire de Chine, Formose et le Japon. Immigration récente vers la Mer Méditerranée.

Indischer und West-Pazifischer Ozean, Kap der Guten Hoffnung, Ostafrika, Rotes Meer östlich bis zu Malaysia, Australien, Indonesien, Philippinen, Volksrepublik China, Formosa und Japan. Ist vor kurzem in das Mittelmeer eingewandert.

Scomberomorus concolor (Lockington, 1879)

Gulf of California, formerly abundant in Monterey Bay, California.

Golfo de California, abundante también anteriormente en la Bahía de Monterrey, California.

Golfe de Californie, précédemment abondant dans la Baie de Monterrey, Californie.

Golf von Kalifornien, ehemals häufiger im Vorkommen im Bai von Monterey, Kalifornien.

Scomberomorus guttatus (Bloch and Schneider, 1801)

Indo-Pacific Ocean from India to Japan.

Océanos Indico y Pacífico, desde la India hasta el Japón.

Océans Indien et Pacifique despuis l'Inde jusqu-au Japon.

Im Indischen und Pazifischen Ozean von Indien bis nach Japan.

Scomberomorus lineolatus (Cuvier *in* Cuvier and Valenciennes, 1831)

Indian Ocean, east coast of Africa, eastward to India and Ceylon.

Océano Indico, costa este del Africa, hacia el este de India y Ceilán.

Océan Indien, côte orientale d'Afrique, en direction de l'Est vers l'Inde et Ceylan.

Im Indischen Ozean, an der Ostküste von Afrika östlich bis nach Indien und Ceylon.

Scomberomorus maculatus (Mitchill, 1815)

Tropical and subtropical waters of the western Atlantic Ocean.

Aguas tropicales y subtropicales del Océano Atlántico occidental.

Eaux tropicales et subtropicales de l'Océan Atlantique occidental.

Tropische und subtropische Gewässer des West-Atlantischen Ozeans.

Scomberomorus niphonius (Cuvier *in* Cuvier and Valenciennes, 1831)

China, Korea and Japan.

China, Corea y Japón.

Chine, Corée et Japón.

China, Korea und Japan.

Scomberomorus queenslandicus Munro, 1943

East and west coasts of Australia.

Costa oriental y occidental de Australia.

Côtes orientale et occidentale de l'Australie.

Ost und Westküste von Australien.

Scomberomorus regalis (Bloch, 1793)

Tropical and subtropical waters of the western Atlantic Ocean.

Aguas tropicales y subtropicales del Océano Atlántico occidental.

Eaux tropicales et subtropicales de l'Océan Atlantique occidental.

Tropische und subtropische Gewässer des West-Atlantischen Ozeans.

Scomberomorus semifasciatus (Macleay, 1884)

Tropical and semitropical waters off Queensland and the Northern Territory of Australia.

Aguas tropicales y semitropicales frente a Queensland y al Territorio Septentrional de Australia.

Eaux tropicales et semi-tropicales au large de Queensland et des territoires septentrionaux de l'Australie.

Tropische und halbtropische Gewässer von Queensland und dem Nordterritorium von Australien.

Scomberomorus sierra Jordan and Starks *in* Jordan, 1895

Eastern Pacific Ocean, from California south to Peru and around the Galapagos Islands.

Océano Pacífico oriental, desde el sur de California hasta el Perú y alrededor de las Islas Galápagos.

Océan Pacifique oriental, depuis la Californie au sud jusqu'au Pérou et autour des Iles Galapagos.

Ost-Pazifischer Ozean, von Kalifornien südlich bis Peru und in der Nähe der Galapagos-Inseln.

Scomberomorus sinensis (Lacépède, 1800)

Western Pacific Ocean, North China and

Japan. Present also in Cambodia but only in the Mekong River system — does not reproduce in fresh water.

Océano Pacífico occidental, China septentrional y Japón. Se encuentra también en Cambodia, pero solamente en el sistema del Río Mekong — no se reproduce en agua dulce.

Océan Pacifique occidental, Chine septentrionale et Japon. Présent aussi au Cambodge mais uniquement dans le réseau fluvial du Mékong — ne se reproduit pas en eau douce.

West-Pazifischer Ozean, Nordchina und Japan, kommt auch in Kambodscha vor, aber dort nur im Flussystem des Mekong —vermehrt sich nicht im Süsswasser.

Scomberomorus tritor (Cuvier *in* Cuvier and Valenciennes, 1831)

Eastern Atlantic, off west coast of Africa, and in the Mediterranean Sea.

Atlántico oriental, frente a la costa occidental del Africa, y en el Mar Mediterráneo.

Atlantique oriental, face à la côte occidentale d'Afrique et dans la Mer Méditerranée.

Ostatlantik, an der Westküste von Afrika und im Mittelmeer.

THUNNUS South, 1845

Thunnus alalunga (Bonnaterre, 1788)

Temperate and tropical waters of all oceans, including the Mediterranean Sea.

Aguas templadas y tropicales en todos los océanos, presente en el Mar Mediterráneo.

Eaux tempérées et tropicales de tous les océans, ainsi que la Mer Méditerranée.

In gemässigten und tropischen Gewässern aller Ozeane einschliesslich des Mittelmeeres.

Thunnus albacares (Bonnaterre, 1788)

Tropical and subtropical waters of the Indo-Pacific and Atlantic Oceans.

Aguas tropicales y subtropicales de los océanos Indico, Pacífico y Atlántico.

Eaux tropicales et subtropicales des Océans Indien, Pacifique et Atlantique.

In Tropischen und subtropischen Gewässern des Indischen, Pazifischen und Atlantischen Ozeans.

Thunnus atlanticus (Lesson, 1830)

Western Atlantic Ocean, Bermuda southward through the Caribbean Sea to Brazil.

Océano Atlántico occidental, al sur de Bermuda a través del Mar Caribe hasta Brasil.

Océan Atlantique occidental, des Bermudes vers le Sud à travers la Mer des Caraïbes jusqu'au Brésil.

Im West-atlantischen Ozean, von Bermuda-Inseln nach dem Süden im Karibischen Meere bis Brasilien.

Thunnus maccoyii (Castlenau, 1872)

Subtropical and temperate waters of the southern region of the Indo-Pacific and Atlantic Oceans.

Aguas subtropicales y templadas de la región meridional de los océanos Indico, Pacífico y Atlántico.

Eaux subtropicales et tempérées de la région méridionale des Océans Indien, Pacifique et Atlantique.

In subtropischen und gemässigten Gewässern der südlichen Bereiche des Indischen, Pazifischen und Atlantischen Ozeans.

Thunnus obesus (Lowe, 1839)

Tropical and subtropical waters of the Indo-Pacific and Atlantic Oceans.

Aguas tropicales y subtropicales de los océanos Indico, Pacífico y Atlántico.

Eaux tropicales et subtropicales des Océans Indien, Pacifique et Atlantique.

In tropischen und subtropischen Gewässern des Indischen, Pazifischen und Atlantischen Ozeans.

Thunnus thynnus (Linnaeus, 1758)

Temperate waters of the north Pacific Ocean, south and north Atlantic Ocean, and in the Mediterranean and the Black Seas.

Aguas templadas del Océano Pacífico norte, al sur y al norte del Océano Atlántico, y en el Mar Mediterráneo y Mar Negro.

Eaux tempérées de l'Ocean Pacifique nord, au sud et au nord de l'Océan Atlantique, dans la Mer Méditerranée et dans la Mer Noire.

In Gewässern des Nord-Pazifischen, Süd und Nord-Atlantischen Ozeans, im Mittelmeere und im Schwarzen Meere.

Thunnus tonggol (Bleeker, 1851)

Indo-West Pacific Ocean, from southern Japan, south to Australia (north, east and west coasts), throughout most of the Indian Ocean, including the Red Sea but absent from most of the east African coast.

Océano Indico, Océano Pacífico occidental, desde el sur del Japón hasta Australia (costas norte, este y oeste), a través de casi todo el Océano Indico, incluyendo el Mar Rojo, pero ausente en la mayor parte de la costa oriental africana.

Océan Indien, Océan Pacifique occidental, depuis le sur du Japon jusqu'a l'Australie (Côtes nord, est et ouest), à travers la plus grande partie de l'Océan Indien, y compris la Mer Rouge, mais absent sur presque toute la côte orientale d'Afrique.

Im Indischen und West-Pazifischen Ozean, von Südjapan südlich bis Australien (Nord, Ost und Westküste), innerhalb fast des ganzen Indischen Ozeans einliesslich des Roten Meeres. Kommt aber nicht am grössten Teil der Ostafrikanischen Küste vor.

REFERENCES CONSULTED
BIBLIOGRAFIA CITADA
TRAVAUX CONSULTES
ZITIERTE LITERATUR

Brown, Peter and George Burder Stratton (Ed.) 1964. World List of Scientific Periodicals Published in the Years 1900-1960. Butterworths, London, 4 volumes: xx + 1824 p.

Collette, Bruce B. and Robert H. Gibbs, Jr. 1963. A preliminary review of the fishes of the family Scombridae. FAO Fish. Rep. (6) vol. 1: 23-32.

Fraser-Brunner, A. 1950. The fishes of the family Scombridae. Ann. Mag. Nat. Hist. 12(3): 131-163.

Gibbs, Robert H., Jr. and Bruce B. Collette. 1967. Comparative anatomy and systematics of the tunas, genus *Thunnus*. U.S. Fish Wildl. Serv. Fish. Bull. 66(1): 65-130.

Matsui, Tetsuo. 1967. Review of the mackerel genera *Scomber* and *Rastrelliger*, with description of a new species of *Rastrelliger*. Copeia 1967(1): 71-83.

Porter, Kenneth I. (Ed.) 1968. World List of Scientific Periodicals—Scientific, Medical and Technical Entries from the British Union Catalogue of Periodicals — New Periodical Titles. Butterworths, London: vi + 49 + 12 + 9 p.

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BIBLIOGRAPHY - BIBLIOGRAFIA
BIBLIOGRAPHIE - BIBLIOGRAPHIE

Abe, Tokaharu, Ryoichi Arai, Sokichi Fujita, and Magojiro Sotokawa
1968 Records of some warm-water fishes from Sanriku district of the northern piscifaunal region of Japan. Bull. Tokai Reg. Fish. Res. Lab. (54): 1-3.

Abe, Koji
See Kobayashi and Abe, 1962.

Aboussaouan, A.
1965 Oeufs et larves de téléostéens de l'ouest africain. II. Distribution verticale. Bull. Inst. Fr. Afr. Noire, 27 Ser. A.(4): 1504-1521. (In French).

1969 Sur une petite collection de larves de téléostéens récoltée au large du Brésil (Campagne "Calypso" 1962). Vie Milieu 20 (3A):595-610. (In French with English and German summaries).

Acara, Altan
1957 Relation between the migration of *Sarda sarda* Bloch and prevailing temperature. Proc. Tech. Pap. Gen. Fish. Coun. Mediterr. (4): 193-196.

Ahlstrom, Elbert H.
1953 Pilchard eggs and larvae and other fish larvae, Pacific coast, 1951. Spec. Scient. Rep. Fish. U.S. Fish Wildl. Serv. (102): 55 p.

1954 Pacific sardine (pilchard) eggs and larvae and other fish larvae, Pacific coast - 1952. Spec. Scient. Rep. Fish. U.S. Fish Wildl. Serv. (123): 76 p.

1956 Eggs and larvae of anchovy, jack mackerel, and Pacific mackerel. Prog. Rep. Calif. Coop. Ocean. Fish. Invest. 1955-1956: 33-42.

1958 Sardine eggs and larvae and other fish larvae, Pacific coast, 1956. Spec. Scient. Rep. Fish. U.S. Fish Wildl. Serv. (251): 84 p.

1959 Vertical distribution of pelagic fish eggs and larvae off California and Baja California. Fishery Bull. Fish. Wildl. Serv. U.S. 60(161): 107-146.

Ahlstrom, Elbert H., and David Kramer
1955 Pacific sardine (pilchard) eggs and larvae and other fish larvae, Pacific coast, 1953. Spec. Scient. Rep. Fish. U.S. Fish Wildl. Serv. (155): 74 p.

1956 Sardine eggs and other fish larvae, Pacific coast, 1954. Spec. Scient. Rep. Fish. U.S. Fish Wildl. Serv. (186): 79 p.

1957 Sardine eggs and larvae and other fish larvae, Pacific coast, 1955. Spec. Scient. Rep. Fish U.S. Fish Wildl. Serv. (224): 90 p.

Ahlstrom, Elbert H.
See also Ueyanagi and Ahlstrom, 1963.

Akyüz, Erdogan F. and Ilham Artüz
1957 Some observations on the biology of tuna (*Thunnus thynnus*) caught in Turkish waters. Proc. Tech. Pap. Gen. Fish. Coun. Mediterr. (4): 93-99.

Aleksandrova, K.
See Goergiev *et al.*, 1963.

Altan, Hanif
1957a Karadeniz baliklarinin pelâjik yumurta ve larvalarinin tayin anahtari: 2 - Palamut Baliği - *Sarda Sarda.* (A key to pelagic eggs and larvae of Black Sea fishes: 2 - Black Sea Bonito - *Sarda sarda.*) Balik Balikç. 5(4): 19-21. (In Turkish).

1957b Orkinos veya ton Balagii *Thunnus thynnus* (Linn.). Balik Balikç 5(7): 16-17. (In Turkish).

Alverson, Franklin G. and Clifford L. Peterson
1963 Synopsis of biological data on bigeye tuna *Parathunnus sibi* (Temminck and Schlegel) 1844. FAO Fish. Rep. (6) vol. 2: 482-514.

Amano, Ryohei
See Inoue *et al.*, 1967; 1970.

Ancieta C., Felipe
1964 Sinopsis sobre la biología y pesquería del "bonito" Sarda chilensis (Cuvier y Valenciennes) frente a la costa del Perú. Revta. Fac. Cienc. Biol. Univ. Nac. Trujillo. 1(1): 17-49. (In Spanish).

Annigeri, G. G.
See George and Annigeri, 1960.

Anonymous
1941 A symposium on the investigation of tuna and skipjack spawning grounds. Kagaku nanyo (So. Sea Sci.), 4(1): 64-75. [In Japanese, English translation: Spawning grounds of tuna and skipjack. *In*: Spec. Scient. Rep. Fish. U.S. Fish Wildl. Serv. (18): 1-11].

1961 Progress report of the cooperative investigations on important neritic-pelagic fisheries resources 1956 and 1957. Edited by: Members of Executive Committee, Conference for Investigations of Important Neritic-Pelagic Fisheries Resources of Japan. Fisheries Agency (Japan) and Fisheries Research Laboratories: 307 p. (In Japanese with an English summary).

1962a Progress report on the cooperative investigations on important neritic-pelagic fisheries resources, 1959. Edited by: Members of Executive Committee, Conference for Investigations on Impor-

tant Neritic-Pelagic Fisheries Resources of Japan. Fisheries Agency (Japan) and Fisheries Research Laboratories: 120 p. (In Japanese with an English summary).

1962b Progress report of the cooperative investigations on important neritic-pelagic fisheries resources 1958. Edited by: Members of Executive Committee, Conference for Investigations on Important Neritic-Pelagic Fisheries Resources of Japan. Fisheries Agency (Japan) and Fisheries Research Laboratories: 136 p. (In Japanese with an English summary).

1965 Report of the Conference of the Fisheries Agency, Japanese Government, for the Fisheries Resources Investigations No. 3. Progress report of the Cooperative Investigations on Fisheries Resources 1962 and 1963. Fisheries Agency (Japan) and Regional Fisheries Research Laboratories: 125 p. (In Japanese).

1966 Report of fisheries resources investigations by the scientists of the Fisheries Agency, Japanese Government No. 6. Progress report of the Cooperative Investigations on Fisheries Resources 1964. Fisheries Agency (Japan) and Regional Fisheries Research Laboratories: 110 p. (In Japanese).

1969 Report of fisheries resources investigations by the scientists of the Fisheries Agency, Japanese Government No. 10. Progress report of the Cooperative Investigations on Fisheries Resources 1965-1967. Fisheries Agency (Japan) and Regional Fisheries Research Laboratories: 180 p. (In Japanese).

1970a Experiments in developing of culture techniques for tunas. Enyo suisan kenkyu-sho, ukiuo shigembu. (Far Seas Fisheries Research Laboratory, Division of Pelagic Resources): 28 p. (In Japanese).

1970b A report on artificial fertilization and hatching of yellowfin tuna — rearing experiments conducted at Owase. (Owase wo kichi to suru kihada jinko jusei narabi ni fuka — shiiku shiken hokokusho). Enyo suisan kenkyusho — Fugyo shingenbu (Far Seas Fisheries Research Laboratory — Division of Pelagic Resources):21 p. (In Japanese).

Anraku, Masateru
See Motoda and Anraku, 1955.

Anraku, Noboru
See Yabe *et al.* 1953.

Aoki, Mitsuyoshi
See Inoue *et al.*, 1967; 1970

Appannasastry, Y.
1969 On the occurrence of the juveniles of the Indian Mackerel *Rastrelliger kanagurta* (Cuvier) in the inshore water of Kakinada. J. Mar. Biol. Ass. India 10 (1): 179-181.

Arai, Ryoichi
See Abe *et al.*, 1968.

Arim, Neclâ
See Demir and Arim, 1957.

Artüz, Ilham
See Akyüz and Artüz, 1957.

Asano, Masahiro
1964 Young albacore taken from the Northeastern Sea area of Japan in August and September, 1963. Bull. Tohoku Reg. Fish. Res. Lab. (24): 20-27. (In Japanese with English summary, English translation by Tamio Otsu, U.S. Bur. Comml. Fish., Honolulu: 13 p., 1965).

Ashmole, Myrtle J. and N. Philip Ashmole
1968 The use of food samples from sea birds in the study of seasonal variation in the surface fauna of tropical oceanic areas. Pacif. Sci. 22(1):1-10.

Ashmole, Myrtle J.
See also Ashmole and Ashmole, 1967.

Ashmole, N. Philip and Myrtle J. Ashmole
1967 Comparative feeding ecology of sea birds of a tropical oceanic island. Bull. Peabody Mus. Nat. Hist. (24): 131 p.

Ashmole, N. Philip
See also Ashmole and Ashmole, 1968.

Balakrishnan, Vylipilli
1957 Occurrence of larvae and young mackerel (*Rastrelliger canagurta Cuvier*) off Vishinjam, near Trivandrum. Curr. Sci. 26(2):57-58.

Bănărescu, Petru
1964 Fauna Republici Populare Romîne — Pisces-Osteichthyes (Peştati Ganoizi şi Ososi). Academia Republicii Populare Romîne, Bucharest, 13: 1-962. (In Rumanian).

Banerji, S. K.
See George and Banerji, 1968.

Barkley, Richard A.
1969 Salinity maxima and the skipjack tuna, *Katsuwonus pelamis*. Bull. Jap. Soc. Fish. Oceanogr., Special number (Prof. Uda's Commemorative Papers): 243-248.

Barnhart, P. S.
1927 Pelagic fish eggs off La Jolla, California. Bull. Scripps Instn. Oceanogr. Tech. Ser. 1(8): 91-92.

Barthélémy-Lefèvre, Georgette F.
1955 Larves de thonidés recueillies au cours des Campagnes du "Président Théodore Tissier." Rapp. P.-V. Réun. Cons. Perm. Int. Explor. Mer. 137: 36-39. (In French).

Basheeruddin, S. and K. Nagappan Nayar
1962 A preliminary study of the juvenile fishes of the coastal waters off Madras City. Indian J. Fish. 1961, 8(1): 169-188.

Basheeruddin, S.
See also Rao and Basheeruddin, 1953.

Belloc, Gérard
1954 Les thons de la Méditerranée — résumé de nos connaissances sur la biologie et la pêche de ces poissons. Première note: germon, pélamide et melva. Proc. Tech. Pap. Gen. Fish. Counc. Mediterr. 2(49): 283-318. (In French).

1955 Mediterranean tunas. Part two: Little tunas and striped-bellied bonito. Proc. Tech. Pap. Gen. Fish. Coun. Mediterr. (3): 471-485. (In French with English abstract).

Bellón, Luis
1954a Historia natural del atún, *Thunnus thynnus* (L.) — ensayo de síntesis. Boln. Inst. Esp. Oceanogr. (67):88 p. (In Spanish).

1954b Rapport préliminaire sur le *Neothunnus albacora* (Lowe), avec des indications sur le *N. macropterus* (Temm. et Schl.). Rapport présenté au "Comité Atlantique," du Conseil International pour l'Exploration de la Mer, Copenhague. Instituto Español de Oceanografía. Tirés-a-part pour le Conseil Permanent International pour l'Exploration de la Mer. 136 p. (In French).

Bennet, P. Sam
1967 Seasonal abundance of small sized juvenile *Rastrelliger kanagurta* at Vizhingam during 1960-1963. Adv. Abstr. Contr. Fish. Aquat. Sci. India 1(4): 18. (Abstract only), Indian J. Fish. 11A (1): 391-406.

Bhimachar, B. S. and P. C. George
1952 Observations on the food and feeding of the Indian mackerel, *Rastrelliger canagurta* (Cuvier). Proc. Indian Acad. Sci. 36B(3): 105-118.

Bigelow, Henry B. and William C. Schroeder
1953 Fishes of the Gulf of Maine. Fishery Bull. Fish Wildl. Serv. U.S. 53(74): 1-577.

Bigelow, Henry B. and William W. Welsh
1925 Fishes of the Gulf of Maine. Bull. Bur. Fish. Wash. 40(1):1-567.

Bini, Giorgio
1952 Osservazioni sulla fauna marina delle coste del Chile e del Perú con speciale riguardo alle specie ittiche in generale ed ai tonni in particolare. Boll. Pesca Pisci. Idrobiol. 7(1):11-60. (In Italian, English translation in files of Inter-Am. Trop. Tuna Commn. :37 p. typescript).

1968 Atlante dei pesci delle coste Italiane. Osteitti. Mondo Sommerso, 6: 177 p. (In Italian).

Blackburn, Maurice
1965 Oceanography and the ecology of tunas. *In*: Harold Barnes (Ed.). Oceanography and Marine Biology — an Annual Review, 3: 299-322, George Allen & Unwin, London. [Summary Japanese translation by M. Uda, *In*: Bull. Jap. Soc. Fish. Oceanogr. (8): 109-119].

Blanc, Maurice, F. D'Aubenton and P. Fourmanoir
1965 A propos d'un Scombridae des eaux douces Cambodgiennes: *Scomberomorus sinensis* (Lacépède, 1802). Bull. Mus. Natn. Hist. Nat. Paris, 2nd Ser. 37(1): 121-123.

Blanc, Maurice
See also D'Aubenton and Blanc. 1965.

Boonprakob, U.
1963 Preliminary results of fish eggs survey in the Gulf of Thailand. Proc. Indo-Pac. Fish. Counc. Sect. 2: 10-19.

1965 The identification of pelagic eggs and larvae of chub mackerel, *Rastrelliger* sp., in the Gulf of Thailand with additional study on their distribution. Contr. Mar. Fish. Lab. Thailand. (4): 115-151. (In Thai).

Borcea, I.
1929 Observations sur les poissons migrateurs dans les eaux Roumaines de la Mer Noire. Annls. Scient. Univ. Jassy, 15: 656-750. (In French).

1933 Nouvelles observations sur les migrations et sur le periode de ponte des espéces de poissons migrateurs de la Mer Noire. Annls. Scient. Univ. Jassy, 17: 503-564. (In French).

Boutière, H.
See Furnestin *et al.*, 1958

Broadhead, Gordon C.
See Schaefer *et al.*, 1963

Brock, Vernon E.
1959 The tuna resource in relation to oceanographic features. Circ. U.S. Fish Wildl. Serv. (65): 1-11.

Bullis, Harvey R., Jr.
1955 Observations on schooling juvenile tuna, *Euthynnus alletteratus*, in the Gulf of Mexico. Copeia (2): 153.

Bureau of Commercial Fisheries Biological Laboratories at Honolulu, San Diego, and Stanford
1963 Skipjack — a world resource. Circ. U.S. Fish Wildl. Serv. 165: 28 p.

Bureau of Commercial Fisheries Biological Laboratory, Honolulu
1964 Central Pacific Fisheries Investigations — results of midwater trawling for juvenile tuna: M/V "Townsend Cromwell" Cruise 7. Comml. Fish. Rev. 26(12): 32-34.

Cable, Louella E.
See Hildebrand and Cable, 1938.

Calkins, Thomas P. and Witold L. Klawe
1963 Synopsis of biological data on black skipjack *Euthynnus lineatus* Kishinouye 1920. FAO Fish. Rep. (6) vol. 2: 130-146.

Calkins, Thomas P.
See also Joseph and Calkins, 1969.

Chacko, P. I.
1950 Marine plankton from the waters around Krusadi Island. Proc. Indian Acad. Sci. 31(B)(3): 162-174.

1955 A review of the 1953-54 fishing of the mackerel *Rastrelliger kanagurta*, of the west coast of Madras State. Proc. Indian Sci. Congr. Pt. 3 Abstracts: 308.

Chang, Hsiao-wei
See Sha *et al.* 1966.

Chiomi, Shingu
1970 Studies relevant to distribution and migration of the southern bluefin tuna. Bull. Far Seas Fish. Res. Lab. (3):57-113. (In Japanese with English synopsis).

Ciacchi, O.
See Sella and Ciacchi, 1925.

Clark, John, W. G. Smith, Arthur W. Kendall, Jr. and Michael P. Fahay
1969 Studies of estuarine dependence of Atlantic coastal fishes. Tech. Pap. Bur. Sport Fish. Wildl. U.S. (28): 132 p.

Clemens, Harold B.
1955 Fishes collected in the tropical eastern Pacific, 1952-53. Calif. Fish Game 41 (2): 161-166.

1956 Rearing larval scombroid fishes in shipboard aquaria. Calif. Fish Game 42(1): 69-79.

1957 Fishes collected in the tropical eastern Pacific, 1954. Calif. Fish Game 43(4): 299-307.

Collignon, Jean
1961 Le thazard ou melva dans l'Atlantique oriental. Bull. Inst. Pêch. Marit. Maroc (7): 55-72.

Conand, F.
1970 Distribution et abondance des larves de quelques familles et espèces de poissons des côtes sénégambiennes en 1968. Doc. Sci. Prov. ORSTOM, Dakar. (26): 52 p. (In French).

Corbin, P. G.
1947 The spawning of mackerel, *Scomber scombrus* L., and pilchard, *Clupea pilchardus* Walbaum, in the Celtic Sea in 1937-39 with observations on the zooplankton indicator species, *Sagitta* and *Muggiaea*. J. Mar. Biol. Ass. U.K. 27: 65-132.

Coupé, R.
See Furnestin *et al.*, 1958

Cunningham, Joseph T.
1891a On some larval stages of fishes. J. Mar. Biol. Ass. U. K. 2(n.s.): 68-74.

1891b Ichthyological contributions. 3. A larval stage of the mackerel. J. Mar. Biol. Ass. U. K. 2(n.s.): 325-332.

Dardignac, Jean
See Furnestin and Dardignac, 1962; Furnestin *et al.*, 1958.

D'Aubenton, F. and Maurice Blanc
1965 Étude systématique et biologique de *Scomberomorus sinensis* (Lacépède, 1802), poisson des eaux douces du Cambodge. Bull. Mus. Natn. Hist. Nat., Paris 2nd Ser. 37(2): 233-243. (In French).

D'Aubenton, F.
See also Blanc *et al.*, 1965.

De Buen, Fernando
1930 Estados larvarios y juveniles de la *Sarda sarda* (Bloch). Trab. Inst. Esp. Oceanogr. (3): 5-32. (In Spanish).

1932 Formas ontogénicas de peces (Nota primera). Notas Resúm. Inst. Esp. Oceanogr. Ser. 2, (57): 1-38. (In Spanish).

1935 Aires de ponte du thon [*Thunnus thynnus* (L.)]. Int. Congr. Zool. 12. Lisbon Section 11: 2123-2136. (In French).

Dekhnik, T. V.
1959 Razmnozhenie i razvitie iaponskoi skumbrii *Pneumatophorus japonicus* (Houttuyn) u beregov yuzhnogo Sakhalina. [Reproduction and development of *Pneumatophorus japonicus* (Houttuyn) off the coast of southern Sakhlin]. Isled. Dal'nevost. Morei SSSR 6:97-108. (In Russian, English translation by M. Slesser, U.S. Naval Oceanogr. Office, Trans. No. 307 :15 p., 1967).

Dekhnik, T. V., M. Juárez, and D. Salabaria (Salabarría)
1966 Raspredelenie pelagicheskikh ikrinok i lichinok ryb v prikubinskikh vodakh. (Distribution of pelagic fish eggs and larvae in Cuban waters). *In*: Issledovaniia Tsentral'no-amerikanskikh Morei. Akademiia Nauk Ukrainskoi SSR, Naukova Dumka, Kiev: 131-170. (In Russian with Spanish and English summaries. English translation of section dealing with family Thunnidae by W. L. Klawe, Inter-Am. Trop. Tuna Commn. 1967).

Dekhnik, T. V. and R. M. Pavlovskaia
1950 Raspredelenie ikry i lichinok nekotorykh ryb Chernogo moria. (Distribution of eggs and larvae of some of the Black Sea fishes.) Trudy AzcherNIRO. (14): 151-176. (In Russian, English translation of sections pertaining to *Sarda sarda* by W. L. Klawe, Inter-Am. Trop. Tuna Commn. 1969).

Delsman, H. C.
1926 Fish eggs and larvae from the Java sea 9. *Scomber kanagurta* C. V. Treubia 8(3-4): 395-399.

1931 Fish eggs and larvae from the Java sea 18. The genus *Cybium*, with remarks on a few other Scombridae. Treubia 13(3-4): 401-410.

Delsman, H. C., and Hardenberg, J. D. F.
1934 VI — De Indische Zeevisschen en Zeevisscherij. Visser & Co., Batavia. 338 p. (In Dutch).

Demir, Muzaffer
1957 Migrations of *Sarda sarda* Bloch in the Black, Marmara, and Aegean Seas; the probable spawning places and times. Proc. Tech. Pap. Gen. Fish. Coun. Mediterr. (4): 127-134.

1961 Note on *Germo alalunga* Gml. and *Euthynnus alletteratus* Raf. in the Sea of Marmara. Proc. Tech. Pap. Gen. Fish. Coun. Mediterr. (6): 219-220.

1963a On the juveniles of *Euthynnus alletteratus* Raf. appeared in Turkish waters in 1959. Rapp. P.-V. Réun. Commn. Int. Explor. Scient. Mer Mediterr. 17(2): 375-377.

1963b Synopsis of biological data on bonito *Sarda sarda* (Bloch) 1793. FAO Fish. Rep. (6) vol. 2: 101-129.

Demir, Muzaffer and Neclâ Arim
1957 Contribution to the biology of the mackerel (*Scomber scombrus* L.). Proc. Tech. Pap. Gen. Fish. Coun. Mediterr. (4): 135-139.

Demir, Muzaffer and N. Demir
1961 Contribution to the knowledge of the eggs of the common bonito (*Sarda sarda* Bloch). Proc. Gen. Fish. Coun. Medit. (6): 213-218.

Demir, Neclâ
1961 Preliminary notes on the eggs, larvae, and spawning of the Spanish mackerel [*Scomber colias* (Gmelin)] in the Sea of Marmara. Rapp. P.-V. Réun. Commn. Int. Explor. Scient. Mer Mediterr. 16(1): 313-316.

See also Demir and Demir, 1961

De Sylva, Donald P. and Warren F. Rathjen
1961 Life history notes on the little tuna, *Euthynnus alletteratus*, from the southeastern United States. Bull. Mar. Sci. Gulf Carib. 11(2): 161-190.

De Sylva, Donald
See also Idyll and de Sylva, 1963a; 1963b; 1963c; and 1963d.

Devanesan, D. W. and V. John
1940 On the natural history of *Rastrelliger kanagurta* (Russell) with special reference to its spawning season and eggs. Curr. Sci. 9(10): 462-464.

Devedjian, Karekin
1926 Pêche et Pêcheries en Turquie. (The Author), Constantinople. 480 p. (In French).

Dieuzeide, R.
1951 Campagne en Méditerranée du navire océanographique de l'Office Scientifique et Technique de Pêches Maritimes "Président Theodore Tissier." Bull. Stn. Aquic. Pêche Castiglione. N. Ser. (3): 85-138. (In French).

Dieuzeide, R. and J. Roland
1955 Contribution à la connaissance des formes jeunes de *Thunnus thynnus* Linné. Bull. Stn. Aquic. Pêche Castiglione. N. Ser. (7): 307-339. (In French).

Dotsu, Yoshie (Dotu, Yosie)
See Uchida and Dotsu, 1958.

Dotu, Yosie (Dotsu, Yoshie)
See Uchida *et al.*, 1958

Dragovich, Alexander
1970 The food of skipjack and yellowfin tunas in the Atlantic Ocean. Fishery Bull. Fish Wildl. Serv., U.S. 68(3): 445-460.

Druzhinin, A. D.
1970 Indian mackerel, *Rastrelliger* spp., in Burma waters. Proc. Indo-Pacif. Fish. Coun. 13(2): 59-81.

Earll, R. Edward
1882 The Spanish mackerel, *Cybium maculatum* (Mitchill) Agassiz; its natural history and artificial propagation, with an account of the origin and development of the fishery. Rep. U.S. Commnr. Fish. 1880: 395-426.

1884 Hatching blackfish and Spanish mackerel. Bull. U.S. Fish Commn. 4: 415-416.

Eckles, Howard H.
1949 Observations on juvenile oceanic skipjack (*Katsuwonus pelamis*) from Hawaiian waters and sierra mackerel (*Scomberomorus sierra*) from the eastern Pacific. Fishery Bull. U.S. Fish Wildl. Serv. 51(48): 245-250.

Ehrenbaum, Ernst
1909 Eier und Larven von Fischen. In: Nordisches Plankton, Zoologischer Teil. Volumes 1 and 2: 413 p. (Reprinted 1964, Asher and Co., Amsterdam.) (In German).

1923 The mackerel - spawning, larval and post-larval forms, age groups, food, enemies. Rapp. P.-V. Réun. Cons. Perm. Int. Explor. Mer. 30: 1-39.

1924 Scombriformes. Rep. Dan. Oceanogr. Exped. Mediterr. 2(8) (Biology): 1-42. (In German. Partial translation, pp. 1-11 and 31-42 not translated. Translation available from U.S. Dept. Interior, English Translations of Fishery Literature. Misc. Ser. No. 112).

Fahay, Michael P.
See Clark *et al.*, 1969

Far Seas Fisheries Research Laboratory
1969 Progress report on the research in 1968 by Far Seas Fisheries Research Laboratory. *In*: Minutes of the Tuna Fisheries Research Conference, 1968. Fisheries Agency (Japan) and Far Seas Fisheries Research Laboratory: 101-116. (In Japanese).

Fisheries Agency, Japan
1963 Report on research boat, *Shoyo-maru*, for 1962 fiscal year. (Exploratory research of the tuna fishing grounds in the eastern Pacific). Suisancho seisan-bu kaiyo-dainika (Second Deep Ocean Section, Marine Production Division, Fish-

eries Agency), Tokyo: 177 pp. (In Japanese).

1964 Report of research boat, *Shoyo-maru*, for 1963 fiscal year. (Reports on the navigation and researches on the tuna resources in the eastern Pacific Ocean). Suisancho chosakenkyu-bu, kenkyu-daiikka (First Research Section, Research Division, Fisheries Agency), Tokyo: 465 p. (In Japanese).

1965 Report of research boat, *Shoyo-maru*, for 1964 fiscal year. (Report on the navigations and researches on tuna and spear fish resources in the eastern Pacific Ocean). Suisancho chosakenkyu-bu, kenkyu-daiikka (First Research Section, Research Division, Fisheries Agency), Tokyo: 417 p. (In Japanese).

1966 Report of research boat, *Shoyo-maru*, for 1965 fiscal year. (Research on the tuna and bill-fish resources in the Atlantic Ocean and survey on the ports visited by the ship). Suisancho chosakenkyu-bu (Research Division, Fisheries Agency), Tokyo: 272 p. (In Japanese).

1968 Report of research boat, *Shoyo-maru*, for 1967 fiscal year. (Southeastern Atlantic Ocean — business report included). Suisancho chosakenkyu-bu (Research Division, Fisheries Agency), Tokyo: 199 p. (In Japanese).

1969 Report of research boat, *Shoyo-maru*, for 1968 fiscal year. (Southwestern Atlantic Ocean — business report included). Suisancho chosakenkyu-bu (Research Division, Fisheries Agency), Tokyo: 183 p. (In Japanese).

1970a Maguro Yoshoku Gijutsu Kaihatsu Kigyoka Shiken — Showa 45 Nendo — Chukan Hokoku. (Interim Report on the Experiments in Developing of Techniques for Tuna Culture — 1970 Fiscal Year). Suisancho chosakenkyu-bu (Fisheries Agency, Research Division): 66 p. (In Japanese with English summary).

1970b Report of research boat, *Shoyo-maru*, 1970 fiscal year. (Eastern Pacific and western Atlantic Ocean — business report included). Suisancho chosakenkyu-bu. (Research Division Fisheries Agency), Tokyo: 103 p.

Fitch, John E. and Arthur O. Flechsig
1949 A brief account of the Monterey Spanish mackerel. Calif. Fish Game 35(4): 275-280.

Fitch, J. E. and P. M. Roedel
1963 A review of the frigate mackerels (genus *Auxis*) of the world. FAO Fish. Rep. (6) vol. 3: 1329-1342.

Flechsig, Arthur O.
See Fitch and Flechsig, 1949.

Fourmanoir, P.
See Blanc *et al.*, 1965.

Fowler, Henry W.
1944 The fishes. *In*: Results of the fifth George Vanderbilt Expedition (1941) (Bahamas, Caribbean Sea, Panama, Galapagos Archipelago and Mexican Pacific Islands). Monogr. Acad. Nat. Sci. Philad. (6): 57-529.

Fry, Donald H., Jr.
1936a A description of the eggs and larvae of the Pacific mackerel (*Pneumatophorus diego*). Calif. Fish Game 22(1): 28-29.

1936b A preliminary summary of the life history of the Pacific mackerel (*Pneumatophorus diego*). Calif. Fish Game 22(1): 30-39.

Fujino, Kazuo
1970 Skipjack tuna subpopulation identified by genetic characteristics in the western Pacific, pages 385-393. *In*: John C. Marr (Ed.), The Kuroshio — A Symposium on the Japan Current.

East-West Center Press, Honolulu: 614 p.

Fujita, Shiro
See Uchida *et al.*, 1958.

Fujita, Sokichi
See Abe *et al.*, 1968.

Fukataki, Hiroshi
1956 On the spawning of Pacific mackerel in the Japan Sea. *In*: Tsushima danryu kaihatsu chosa — dai 4 dai shimpojium happyo rombun. (Exploratory Survey of the Tsushima Warm Current — Reports presented at the 4th Symposium). Suisancho [(Japan) Fisheries Agency], Shimonoseki: 261-272. (In Japanese).

See also Shimomura and Fukataki, 1957.

Furnestin, Jean and Jean Dardignac
1962 Le thon rouge du Maroc atlantique (*Thunnus thynnus* Linné). Revue Trav. Inst. Pêch. Marit. 26(4): 381-398.

Furnestin, J., J. Dardignac, C. Maurin, A. Vincent, R. Coupé, and H. Boutière
1958 Données nouvelles sur les poissons du Maroc atlantique. Revue Trav. Inst. Pêch. Marit. 22(4): 379-493.

Fursa, T. I.
1969 Kolichestvennaia i kachestvennaia kharakteristika ikhtioplanktona u zapadnogo poberezh'ia Indostana. Vop. Ikhtiol. 9(3): 497-507. (In Russian). Quantitative and qualitative characterization of the ichthyoplankton off the western shore of Hindustan. Prob. Ichthyol. 9(3): 394-403. (In English).

Furuya, Yaeko
See Mori *et al.*, 1969.

George, P. C.
1964 Our current knowledge on the food and feeding habits of the Indian mackerel, *Rastrelliger kanagurta* (C.) Marine Biological Association of India, Proceedings of the Symposium on Scombroid Fishes. Mandapam Camp, Part 2: 569-573.

See also Bhimachar and George, 1952

George, P. C. and G. G. Annigeri
1960 On the occurrence of small-sized mackerels (*Rastrelliger canagurta* (Cuvier)) off Ratnagiri coast. Curr. Sci., 29(8): 319-320.

George, P. C. and S. K. Banerji
1968 Age and growth studies on the Indian mackerel *Rastrelliger kanagurta* (Cuvier) with special reference to length-frequency data collected at Cochin. Ad. Abstr. Contr. Fish. Aquat. Sci. India 2(1):5 (Abstract only), Indian J. Fish., 11A(2): 621-638.

Georgiev, Zh., K. Aleksandrova, and D. Khr. Nikolov
1963 Danni za razpredelenieto na iaitsata i lichinkite na niakoi vidove ribi prez 1961 g. pred b"lagarskiia briag. (Données sur la répartition des oeufs et des larves de certaines espèces de poissons, en 1961, au large de côtes bulgares de la mer Noire.) Izv. Tsent. Nauchnoizsled. Inst. Ribov. Ribol. Varna 3: 173-182. (In Bulgarian with Russian and French summaries).

Gorbunova, Nina N.
1963 Lichinki skumbrievidnykh ryb (Pisces, Scombriformes) iz Indiiskogo okeana. (Larvae of mackerel-like fish (Pisces, Scombriformes) from the Indian Ocean). Trudy Inst. Okeanol. 62: 68-95. (In Russian, translation into English by U.S. Dept. of Commerce, Office of Technical Services, Washington, D.C.).

1965a O nakhozdenii lichinok skumbrievidnykh ryb (Pisces, Scombroidei) v vostochnoi chasti Indiiskogo okeana. [The distribution of scombroid larvae (Pisces, Scombroidei) in the eastern part of the Indian Ocean.] Trudy Inst. Okeanol. 80: 32-35. (In Russian, English trans-

lation by JPRS for U.S. Bur. Comml. Fish., 5 pp. 1966).

1965b O nereste skumbrievidnykh ryb (Pisces, Scombroidei) v Tonkinskom zalive Yuzhno-Kitaiskogo moria. [On spawning of scombroid fishes (Pisces, Scombroidei) in the Gulf of Tonkin, South China Sea]. Trudy, Inst. Okeanol., 80: 167-176. (In Russian with English Summary).

1965c Sroki i usloviya razmnozheiya skumbrievidnykh ryb (Pisces, Scombroidei). [The spawning seasons and conditions of scombroid fishes (Pisces, Scombroidei)]. Trudy Inst. Okeanol. 80: 36-61. (In Russian, English translation available from National Marine Fisheries Service, Washington, 28 pp.).

1966 Researches on scombroid fishes. Int. Indian Ocean Exped. Newsl. 4(2) (part 2): 1-5.

1969 O dvukh tipakh lichonok makrelevidnogo tuntsa roda *Auxis* (Pisces Scombroidei). Vop. Ikhtiol. 9(6): 1036-1045. (In Russian). Two types of larval frigate mackerel, genus *Auxis* (Pisces, Scombroidei). Probl. Ichthyol. 9(6): 833-840. (In English).

Gorbunova, Nina N. and D. Salabarría (Salabaria)

1967 Razmnozhenie skumbrievidnykh ryb (Pisces, Scombroidei) v zapadnykh raionakh Atlanticheskogo okeana. [Reproduction of scombroid fishes (Pisces, Scombroidei) in western regions of the Atlantic]. pp. 120-131. *In*: Sovetsko-Kubinskie Rybokhozyastvennye Issledovaniia. Investigaciones Pesqueras Soviético-Cubanas. Pishchevaya Promyshlennost'; Moscow 263 pp. (In Russian and Spanish, English translation by W. L. Klawe Int.-Am. Trop. Tuna Commn. 1968. 24 p.).

Greenhood, Edward C.

1952 Results of the examination of four small yellowfin tuna, *Neothunnus macropterus*. Calif. Fish Game, 38(2): 157-163.

Günther, Albert

1889 Report on the pelagic fishes collected by H. M. S. Challenger during the years 1873-76. Voyage of H. M. S. Challenger, Zoology. Queen's Printer, London. 31 (Part 78): 1-47. Reprinted by Johnson Reprint, N.Y. 1965. Reprinted *In*: Historiae Naturalis Classica, 28 in two volumes, with original paginations "Report on the Shore Fishes — Deep-Sea Fishes — Pelagic Fishes — Collected by H. M. S. Challenger," J. C. Cramer, Weinheim, W. Germany, 1963.

Hardenberg, J. D. F.

See Delsman and Hardenberg, 1934

Hattori, Shigemasa

1964 Studies on fish larvae in the Kuroshio and adjacent waters. Bull. Tokai Reg. Fish. Res. Lab. (40): 1-158. (In Japanese with English synopsis).

1965 Fish eggs and larvae in the Kuroshio. Inform. Bull. Planktol. Japan (12): 40-48. (In Japanese with English abstract).

1970 Preliminary note on the structure of the Kuroshio from the biological point of view, with special reference to pelagic fish larvae, pages 399-404. *In*: John C. Marr (Ed.), The Kuroshio — A Symposium on the Japan Current. East-West Center Press, Honolulu: 614 p.

Hayano, Takanori

1954 Distribution of jack and Pacific mackerel larvae along the west coast of Kyushu. *In*: Tsushima danryu kaihatsu chosa — dai 1 kai shimpojium happyo rombun. (Exploratory Survey on the Tsushima Warm Current — Reports presented at the First Symposium). Suisancho [(Japan) Fisheries Agency]: 251-252. (In Japanese).

Hayasi, Sigeiti, Tsutomo Koto, Chiomi Shingu,

Susumu Kume, and Yasuo Morita
1970 Status of the tuna fisheries resources in the Atlantic Ocean, 1956-67. Far Seas Fish. Res. Lab., S Series, (3): 1-72. (In Japanese and English).

He, Gui-fen
See Sha *et al.*, 1966

Heldt, H.
1926 Résumé de nos connaissances actuelles sur le thon rouge *Thunnus thynnus* L. Bull. Stn. Océanogr. Salammbô. (5): 44 p. (In French).

1928 Thon rouge. Rapp. P.-V Réun. Commn. Int. Explor. Scient. Mer Mediterr. (3): 93-114.

1930 Le thon rouge et sa pêche. Rapp.-V. Réun. Commn. Int. Explor. Scient. Mer Mediterr. (5): 131-172.

1932a. Le thon rouge et sa pêche (7e Rapport). Rapp. P.-V. Réun. Commn. Int. Explor. Scient. Mer Mediterr. (7): 203-318. (In French).

1932b Le thon rouge et sa pêche rapport pour 1931. Bull. St. Océanogr. de Salammbô. (29): 168 p.

1934 Le thon rouge et sa pêche (8e Rapport). Rapp. P.-V. Réun. Commn. Int. Explor. Scient. Mer Mediterr. (8): 185-255. (In French).

Hempel, Gotthilf
See Nellen and Hempel, 1970.

Herald, Earl S.
1951 Pseudofins on the caudal peduncle of juvenile scombroids. Calif. Fish Game 37(3): 355-357.

Herre, A. W. C. T. and G. S. Myers
1937 A contribution to the ichthyology of Malay Peninsula. Bull. Raffles Mus. 13: 5-75.

Higgins, Bruce E.
1967 The distribution of juveniles of four species of tunas in the Pacific Ocean. Proc. Indo-Pacif. Fish. Coun. Sec. 2: 79-99.

1970 Juvenile tunas collected by midwater trawling in Hawaiian waters, July-September 1967. Trans. Am. Fish. Soc. 99(1): 60-69.

Hildebrand, Samuel F. and Louella E. Cable
1938 Further notes on the development and life history of some teleosts at Beaufort, N.C. Bull. Bur. Fish., Wash. 48(24): 505-642.

Hildebrand, Samuel F. and William C. Schroeder
1928 Fishes of Chesapeake Bay. Bull. Bur. Fish., Wash. 43(1): 1-388.

Hiyama, Yoshio
See Nakamura and Hiyama, 1957.

Hodder, Hideyuki
See Parsons and Hodder, 1970.

Hotta, Hideyuki
1952 Some observations on feeding behavior of juvenile frigate mackerel (*Auxis tapeinosoma* (Bleeker)) along the coast of Tokushima Prefecture. Tokushimaken suisan shikenjo jigyo-hokoku. (Tokushima Prefecture, Fishery Experimental Station, Progress Report) for 1950-1951: 33 p. (In Japanese).

1953 On the distribution of young of skipjack, *Katsuwonus pelamis*, in the southern seas of Kyushu. Bull. Tohoku Reg. Fish. Res. Lab. (2): 19-21. (In Japanese with English summary).

1955 Seasonal distribution and growth of the "frigate mackerel" *Auxis tapeinosoma* Bleeker along the Pacific coast of Japan. Bull. Tohoku Reg. Fish. Res. Lab. (4):120-126. (In Japanese with English abstract).

Hotta, Hideyuki and Toru Ogawa
1955 On the stomach contents of the skipjack, *Katsuwonus pelamis*. Bull. Toho-

ku Reg. Fish. Res. Lab. (4): 62-82. (In Japanese with English summary).

Houde, Edward D. and William J. Richards.
1969 Rearing larval tunas in the laboratory. Comml. Fish. Rev. 31(12): 32-34.

1970 Criando larvas de atún en el laboratorio. Pesca Mar. Los Ang. (Tijuana, Mex.), 22(4): 28-29. (In Spanish).

Howell R., Luis and Mar Juárez F.
1954 Estados larvales y juveniles del bonito (*Katsuwonus pelamis*). Torreia (22): 14 p. (In Spanish).

Hubbs, Carl L.
1936 Fishes of the Yucatan Peninsula. Publs. Carnegie Inst. (457): 157-287.

Hunter, John R. and Charles T. Mitchell
1966 Association of fishes with flotsam in the offshore waters of Central America. Fishery Bull. Fish Wildl. Serv. U.S. 66 (1): 13-29.

Hunter, John R.
See also Mitchell and Hunter, 1970; Van Olst and Hunter, 1970.

Idyll, Clarence P. and Donald de Sylva
1963a Synopsis of biological data on bonito *Sarda sarda* (Bloch) 1793 Western Atlantic). FAO Fish. Rep. (6) vol 2: 755-760.

1963b Synopsis of biological data on the blackfin tuna *Thunnus atlanticus* (Lesson) 1830 (Western Atlantic). FAO Fish. Rep. (6) vol. 2: 761-770.

1963c Synopsis of biological data on yellowfin tuna *Thunnus albacares* (Bonnaterre) 1788 (Western Atlantic). FAO Fish. Rep. (6) vol. 2: 771-777.

1963d Synopsis of biological data on the frigate mackerel *Auxis thazard* (Lacépède) 1802 (Western Atlantic). FAO Fish. Rep. (6) vol. 2: 778-781.

Iizuka, Keiki and Katsumi Kotaki
1969 Some rearing experiments for the improvement of tagging techniques of the juvenile mackerels. Bull. Tohoku Reg. Fish. Res. Lab. (29): 19-36. (In Japanese with English summary).

Il'ina, P. V.
1951 Ikrinki i lichinki ryb, sobrannye v Ussuriiskom zalive. Izv. TINRO 35: 189-194. (In Russian).

Imai, Sadahiko
See Uchida *et al.*, 1958.

Inanami, Yoshiyuki
1942 Small skipjack caught at Truk. Nanyo suisan joho (So. Sea Fish. News), 6(1): 7. (In Japanese, English translation *In*: B. M. Shimada, Contribution to the biology of tunas from the western equatorial Pacific. Fishery Bull. Fish. Wildl. Serv. U.S. 52 (62): 111-119, 1951).

Inoue, Motoo, Ryohei Amano, Yukinobu Iwasaki and Mitsuyoshi Aoki
1967 Ecology of various tunas under captivity — I Preliminary rearing experiments. J. Coll. Mar. Sci. Technol. Tokai Univ. (2): 197-209. (In Japanese with English abstract).

Inoue, Motoo, Yukonobu Iwasaki, Ryohei Amano, Mitsuyoshi Aoki and Minoru Yamauti
1970 Ecology of various tunas under captivity — II Behaviour of tuna shown against light and darkness. J. Coll. Mar. Sci. Technol. Tokai Univ. (4): 53-58. (In Japanese with English abstract).

Ishiyama, Reizo and Keisuke Okada
1957 Postlarval form of the skipjack (*Katsuwonus pelamis*) from the Phoenix Islands. J. Shimonoseki Coll. Fish. 7(1):141-146. (In Japanese with English summary).

Iwasaki, Yukinobu
See Inoue *et al.*, 1967; 1970.

Jensen, Ann
See Richards *et al.*, 1969a; 1969b; 1970.

John, V.
See Devanesan and John, 1940.

Jones, Santhappan
1960a Notes on eggs, larvae and juveniles of fishes from Indian waters — III. *Katsuwonus pelamis* (Linnaeus) and IV. *Neothunnus macropterus* (Temminck and Schlegel). Indian J. Fish. 6(2): 360-373.

1960b Notes on eggs, larvae and juveniles of fishes from Indian waters — V. *Euthynnus affinis* (Cantor). Indian J. Fish. 7(1): 101-106.

1961 Notes on eggs, larvae and juveniles of fishes from Indian waters — VI. Genus *Auxis* Cuvier—VII. *Sarda orientalis* (Temminck & Schlegel). Indian J. Fish. 7(2): 337-347.

1962 Notes on eggs, larvae and juveniles of fishes from Indian waters — VIII. *Scomberomorus guttatus* (Bloch and Schneider) IX. *Scomberomorus commerson* (Lacépède) and X. *Scomberomorus lineolatus* (Cuvier). Indian J. Fish. 8(1): 107-120.

1963a Notes on eggs, larvae and juveniles of fishes from Indian waters — XI. Further observations on the genus *Auxis* Cuvier. Indian J. Fish. 8(1): 413-421.

1963b Synopsis of biological data on the long corseletted frigate mackerel *Auxis thynnoides* Bleeker 1855. FAO Fish. Rep. (6), vol. 2:782-810.

1965 Notes on eggs, larvae and juveniles of fishes from Indian waters — XIV. Further notes on *Xiphias gladius* Linnaeus. Indian J. Fish. 9(2): 525-529.

Jones, Santhappan and M. Kumaran
1963 Distribution of larval tuna collected by the Carlsberg Foundation's Dana Expedition (1928-1930) from the Indian Ocean. FAO Fish. Rep. (6) vol. 3: 1753-1774.

1964 Eggs, larvae and juveniles of Indian scombroid fishes. Marine Biological Association of India, Proceedings of the Symposium on Scombroid Fishes. Mandapam Camp, Part 1: 343-378.

Jones, Santhappan and Horacio Rosa Jr.
1965 Synopsis of biological data on Indian mackerel *Rastrelliger kanagurta* (Cuvier) 1817 and short bodied mackerel *Rastrelliger brachysoma* (Bleeker) 1851. FAO Fish. Synops. (29): 34 pages (without pagination).

1967 Synopsis of biological data on the fishes of the genus *Rastrelliger* Jordan and Starks 1908 with an annotated bibliography. Marine Biological Association of India, Proceedings of the Symposium on Scombroid Fishes. Mandapam Camp, Part 3: 1190-1236.

Jones, Santhappan and E. G. Silas
1960 Indian tunas - a preliminary review, with a key for their identification. Indian J. Fish. 7(2): 369-393.

1963 Synopsis of biological data on skipjack *Katsuwonus pelamis* (Linnaeus) 1758 (Indian Ocean). FAO Fish Rep. (6) vol. 2: 663-694.

1964 A systematic review of the scombroid fishes of India. Marine Biological Association of India, Proceedings of the Symposium on Scombroid Fishes. Mandapam Camp, Part 1:28-105.

Jones, Santhappan
See also Matsumoto *et al.*, 1969

Joseph, James and Thomas P. Calkins
1969 Population dynamics of the skipjack tuna (*Katsuwonus pelamis*) of the eastern Pacific Ocean. Bull. Inter-Am. Trop. Tuna Commn. 13(1): 1-273. (In English and Spanish).

Juárez F., Mar

See Dekhnik *et al.*, 1966; Howell and Juárez, 1954.

Kagoshima Prefectural Fisheries Experimental Station
1926 Experimental skipjack fishing. Kagoshima-ken suisan shikenjo jigyo hokoku (Prog. Rep. Kagoshima Pref. Fish. Expt. Stn.) for 1924: 1-51. (In Japanese).

1927 Experimental skipjack fishing. Kagoshima-ken suisan shikenjo jigyo hokoku (Prog. Rep. Kagoshima Pref. Fish. Expt. Stn.) for 1925: 1-38. (In Japanese).

Kaikini, A. S.
1960 The fisheries of Malwan. Indian J. Fish. 7(2): 348-368.

Kamimura, Tadao
1966 Part II. Stock assessment. *In*: Symposium on Tuna Fisheries. Bull. Jap. Soc. Scient. Fish. 32(9): 756-786, 829. (In Japanese with English summary).

Kamiya, Takashi
1916 Pelagic fish eggs and larvae in the Tateyama Bay. Rep. Fish. Inst. (Suisan koshujo shiken hokoku) 11(5): 1-92. (In Japanese).

1922 Pelagic fish eggs and larvae in the Tateyama Bay. Part 2. Rep. Fish. Inst. (Suisan koshujo shiken hokoku) 18(3): 1-39. (In Japanese).

1924 Key to the pelagic fish eggs of Japan. J. Fish. Res. (Suisan kenkyu-shi) 19 (6): 33-40. (In Japanese).

1925 Pelagic fish eggs and larvae in the Tateyama Bay. Part 3. Pelagic eggs and larvae along the Hokuriku coast. J. Fish. Res. Inst., Tokyo (Suisan kenkyukai ho) 21(3): 71-106. (In Japanese).

Kanai, Fukuko
See Yokota *et al.*, 1961

Kändler, Rudolf
1952 Jahreszeitliches Vorkommen und unperiodisches Auftreten von Fischbrut, Medusen und Dekapodenlarven im Fehmarnbelt in den Jahren 1934 - 1943. Ber. Dt. Wiss. Kommn. Meeresforsch. 12(1): 49-85. (In German).

1954 Ueber das Laichen der Makrele (*Scomber scombrus* L.) in der Kieler Bucht. Kieler Meeresforsch. 10(2): 182-201. (In German).

1961 Ueber das Vorkommen von Fischbrut, Decapodenlarven und Medusen in der Kieler Förde. Kieler Meeresforsch. 17(1):48-64. (In German with English summary).

Karlovac, Jozica
1961 Observations sur la nourriture du stade planctonique de *Scomber scombrus* L. en Adriatique. Rapp. P.-V. Réun. Commn. Int. Explor. Scient. Mer Mediterr. 16(1): 333-334. (In French).

1962 Ispitivaje sadržaja probavnog trakta kod planktonskogo stadija skuse (*Scomber scombrus* L.) u Jadranu. Izvješća 4(4a): 16 p. (In Serbo-Croatian with French summary).

Kawasaki, Tsuyoshi
1964 Population structure and dynamics of skipjack in the North Pacific and its adjacent waters. Bull. Tohoku Reg. Fish. Res. Lab. 24: 28-47. (In Japanese with an English summary).

1965 Ecology and dynamics of the skipjack population (I), (II). Nihon suisan shigen hogo kyokai, suisan kenkyu sosho (Study Ser. Jap. Fish. Resor. Conserv. Ass.), 8-1:1-48, 8-2:49-108. [In Japanese, English translation: 1967 - by M. P. Miyake (Part I) and by U.S. Joint Publications Research Service (Part II). Int-Am. Trop. Tuna Commn. and

U.S. Bur. Comml. Fish. 54 p. and: 79 p.]

1968 On the ecology of the young mackerel of the Pacific population. Bull. Tokai Reg. Fish. Res. Lab., (55): 59-114. (In Japanese with English abstract).

Kazanova, I. I.
1962 Lichinki tuntsov tropicheskoi zony Atlanticheskogo okeana. (Tuna larvae of the tropical zone of the Atlantic Ocean.) Vop. Ikht. 2 (3) (24): 451-461. (In Russian, English translation by Branch of Reports, U.S. Bur. Comml. Fish. Wash. D.C.).

See also Vodianitskii and Kazanova, 1954.

Kendall, Arthur W., Jr.
See Clark *et al.*, 1969

Kikawa, Shoji and Staff of the Nankai Regional Fisheries Research Laboratory.
1963a Synopsis of biological data on bonito *Sarda orientalis* Temminck and Schlegel 1842. FAO Fish. Rep. (6) vol. 2: 147-156.

1963b Synopsis on the biology of little tuna *Euthynnus yaito* Kishinouye 1923. FAO Fish. Rep. (6) vol. 2: 218-240.

Kikawa, Shoji
See also Nakamura and Kikawa, 1966; Yabe *et al.*, 1958.

Kishinouye, Kamakichi
1917 The food of tunas. Suisan gakkai-ho (Proc. Scient. Fish. Ass.) 2(1): 106-108. (In Japanese, English translation by W. G. Van Campen, U.S. Bur. Comml. Fish., Honolulu Biological Laboratory, Translation No. 29).

1919 The larval and juvenile stages of the Plecostei. Suisan gakkai ho (Proc. Scient. Fishery Ass.) 3(2): 49-53. [In Japanese, English translation *In*: Spec. Scient. Rep. Fish. U.S. Fish Wildl. Serv. (19): 9-11].

1922 Carangid-like markings of skipjack. Suisan gakkai ho (Proc. Scient. Fish. Ass.) 3(4): 304-305. (In Japanese).

1923 Contribution to the comparative study of the so-called scombroid fishes. J. Coll. Agrc. Imp. Univ., Tokyo 8(3): 293-475.

1924 Observations on the skipjack fishing grounds. Suisan gakkai ho (Proc. Scient. Fish. Ass.) 4(2): 87-92. [In Japanese, English translation *In*: Spec. Scient. Rep. Fish. U.S. Fish Wildl. Serv. (19):12-14].

1926 An outline of studies of the Plecostei (Tuna and skipjack) in 1925. Suisan gakkai ho (Proc. Scient. Fish. Ass.) 4(3): 125-137. [In Japanese, English translation *In*: Spec. Scient. Rep. Fish. U.S. Fish Wildl. Serv. (19): 1-8].

Kite, J. A.
1885 Report upon apparatus and facilities needed for hatching Spanish mackerel. Rep. U.S. Commn. Fish., 11: 1095-1100.

Klawe, Witold L.
1958 Data collected on Tuna Spawning Survey Cruise — July 1-20, 1957. Data Rep. Inter-Am. Trop. Tuna Commn.: 17 p.

1959 Nuevo examen de atunes jóvenes capturados frente a la costa occidental de México durante la Quinta Expedición George Vanderbilt (1941). Ciencia, Méx. 18(11-12): 245-247. (In Spanish with English summary).

1960a Larval tunas from the Florida Current. Bull. Mar. Sci. Gulf Carib. 10(2): 227-233.

1960b Animals from night-light collections, p. 7-9. *In*: R. W. Holmes and M. Blackburn (Ed.) Scot Expedition April-June 1958. Spec. Scient. Rep. Fish. U.S. Fish Wildl. Serv. (345): 106 p.

1961a Young scombroids from the waters between Cape Hatteras and Bahama

Islands. Bull. Mar. Sci. Gulf Carib. 11(1): 150-157.

1961b Notes on larvae, juveniles, and spawning of bonito (*Sarda*) from the eastern Pacific Ocean. Pacif. Sci. 15 (4): 487-493.

1961c Informe sobre los datos obtenidos en el "Tuna Spawning Survey Cruise," del 1° al 20 de julio de 1957. Ciencia, Méx. 21(2): 65-74. (In Spanish).

1962 Bonito juvenil (*Sarda chiliensis*) en las aguas del sur de Baja California. Ciencia, Méx. 21(4): 180. (In Spanish).

1963 Observations on the spawning of four species of tuna (*Neothunnus macropterus, Katsuwonus pelamis, Auxis thazard,* and *Euthynnus lineatus*) in the Eastern Pacific Ocean, based on the distribution of their larvae and juveniles. Bull. Inter-Am. Trop. Tuna Commn. 6(9): 448-540. (In English and Spanish).

1964 Food of the black-and-yellow sea snake, *Pelamis platurus,* from Ecuadorian coastal waters. Copeia (4): 712-713. (Summary in Spanish).

1966 Notes on occurrence of young and spawning of *Scomberomorus sierra* in the Eastern Pacific Ocean. Pacif. Sci. 20(4): 445-451. (Summary in Spanish).

1969 Distribution of larval tunas. Eastropac Information Paper, Fishery Oceanography Center, La Jolla (10): 49-53.

1970 Scombroid larvae. Figures 20-FS, 20-FA, 30-FS, and 30-FA. *In*: Love, Cuthbert M. (Ed.) Eastropac Atlas — Volume 4. Circ. U.S. Natn. Mar. Fish. Serv. (330): i-v + unpaginated section.

Klawe, Witold L. and Bell M. Shimada
1959 Young scombrid fishes from the Gulf of Mexico. Bull. Mar. Sci. Gulf Carib. 9(1): 100-115.

Klawe, Witold L., J. J. Pella and W. S. Leet
1970 The distribution, abundance and ecology of larval tunas from the entrance to the Gulf of California. Bull. Inter-Am. Trop. Tuna Commn. 14(4): 507-544. (In English and Spanish).

Klawe, Witold L.
See also Calkins and Klawe, 1963; Matsumoto *et al.,* 1966; 1969.

Klima, Edward F.
1959 Aspects of the biology and the fishery for Spanish mackerel, *Scomberomorus maculatus* (Mitchill), of Southern Florida. Tech. Ser. Fla. St. Bd. Conserv. (27): 39 p.

Kobayashi, Kiyu
1960 Larvae and young fishes collected around the current rip in Ishikari Bay. Bull. Fac. Fish. Hokkaido Univ. 11(3): 106-118. (In Japanese with English summary).

Kobayashi, Kiyu and Koji Abe
1962 Studies on the larvae and young of fishes from the boundary zones off the south-eastern coast of Hokkaido, Japan. Bull. Fac. Fish. Hokkaido Univ. 13(3): 165-179. (In Japanese with English summary).

Koga, Sigeyuki
1958 On the difference of the stomach contents of tuna and black marlin in the south equatorial Pacific Ocean. Bull. Fac. Fish. Nagasaki Univ. (7): 31-40. (In Japanese with an English summary).

Kosiakina, E. G.
1938 Pelagicheskaia ikra ryb v raione Novorssiiska. (The pelagic ova of fishes in the region of Novorossisk.) Trudy Novorossisk. Biol. Sta. 2(2): 7-28. (In Russian with English summary).

Kotaki, Katsumi
See Iizuka and Kotaki, 1969.

Koto, Tsutomu

See Hayasi *et al*; 1970.

Krakatitsa, V. V.
1970 Lichinki *Auxis thazard* (Lac.) (Pisces, Thunnidae) i ikh raspredelenie na akvatorii Adenskogo zaliva. (Larvae of *Auxis thazard* (Lac.) (Pisces, Thunnidae) and their distribution in the Gulf of Aden.). Trudy AzcherNIRO (29): 139-143. (In Russian).

Kramer, David
1960 Development of eggs and larvae of Pacific mackerel and distribution and abundance of larvae 1952-56. Fishery Bull. Fish Wildl. Serv. U.S. 60(174): 393-438.

1969 Synopsis of the biological data on the Pacific mackerel, *Scomber japonicus* Houttuyn (Northeast Pacific). Circ. U.S. Fish. Wildl. Serv. (302): 18 p.

See also Ahlstrom and Kramer, 1955; 1956; 1957.

Kramer, David and Paul E. Smith
1970 Seasonal and geographic characteristics of fishery resources. California Current region — IV. Pacific mackerel. Comml. Fish. Rev. 32(10): 47-49.

Krotov, A.
1938 Pelamida v Chernom more. Ryb. Khoz. 14(2): 15-19. (In Russian).

Kubo, Itsuo
1966 Zoku suisan shigen kakuron (Treatise on fisheries resources, Part 2.). Suisangaku senshu (Fish. Sci. Ser.), Tokyo, 24: 273 p. (In Japanese).

Kumaran, M.
1964a Observations on the food of juveniles of *Scomberomorus commerson* (Lacépède) and *S. guttatus* (Bloch and Schneider) from Vizhingam, west coast of India. Marine Biological Association of India, Proceedings of the Symposium on Scombroid Fishes, Mandapam Camp. Part 2,: 586-590.

1964b Studies on the food of *Euthynnus affinis affinis* (Cantor), *Auxis thazard* (Lacépède), *Auxis thynnoides* Bleeker and *Sarda orientalis* (Temminck and Schlegel). Marine Biological Association of India, Proceedings of the Symposium on Scombroid Fishes, Mandapam Camp. Part 2: 599-606.

See also Jones and Kumaran, 1963; 1964.

Kume, Susumu
1962 A note on the artificial fertilization of bigeye tuna, *Parathunnus mebachi* (Kishinouye). Rep. Nankai Reg. Fish. Res. Lab. (15): 79-84.

See also Hayasi *et al.*, 1970.

Kunitsyn, Yu.
1968 Ustanovka dlya inkubatsii pelagicheskoi ikry ryb. (Apparatus for incubating pelagic eggs of fishes.) Ryb. Khoz. 44(6): 6 (In Russian, English translation by Fisheries Research Board of Canada, Translation Series No. 1163).

Kuthalingam, M. D. K.
1956 Observations on the food and feeding habits of the Indian mackerel *Rastrelliger kanagurta* (Russel). J. Zool. Soc. India 8(2):99-106.

1959 Observations on the food and feeding habits of postlarvae, juveniles and adults of some Madras fishes. J. Madras Univ. 29B(2): 139-152.

Laurs, R. Michael
1970 Zooplankton and fish larvae. Page 10. *In*: Love, Cuthbert M. (Ed.) Eastropac Atlas — Volume 1. *Note* pages vii-viii, and 1-12 originally printed and distributed with Volume 4, whereas the rest of Volume 1 is in preparation. Circ. U.S. Natn. Mar. Fish. Serv. (330): vii-viii, 1-12, remaining pages in preparation.

Lebour, Marie V.
1918 The food of post-larval fish. J. Mar. Biol. Ass. U. K. 11(4): 433-469.

Le Danois, Edouard
1951 Sur la présence de thon blanc ou germon sur les côtes de Venezuela et sur le lieu de ponte de cette espèce dans l'Atlantique Nord. C. R. Hebd. Séanc. Acad. Sci., Paris 232: 1029-1030. (In French).

Lee, Mi Ja
See Lim and Lee, 1970.

Le Gall, Jean
1938 *Scomber scombrus* Linne, 1758. *In*: Faune Ichthyologique de l'Atlantique Nord. Conseil Permanent International pour l'Exploration de la Mer. Cahier 10. No pagination. (In French).

1949. Germon. Résumé des connaissances acquises sur la biologie du germon. Revue Trav. Off. (Scient. Tech.) Pêche. Marit. 15(1-4): 1-42. (In French).

Leet, William S.
See Klawe *et al.*, 1970

Lim, Joo Yeoul and Mi Ja Lee
1970 The occurrence and distribution of fish eggs and larvae in the Korean Adjacent Sea. Abstract No. 334, p. 63. *In*: Preprints — 2nd CSK Symposium Abstracts, 28 September — 1 October 1970. Japanese National Commission for UNESCO :67 p.

Lissner, H.
1938 Zur Biologie der Makrele des Bosporus. Int. Revue Ges. Hydrobiol. Hydrogr. 36: 184-212. (In German).

Lütken, Christian F.
1880 Spolia Atlantica. Bidrag til kundskab om formforandringer hos fiske under deres vaext og udvikling, saerligt hos nogle af Atlanterhavets højsøfiske. K. Danske Vidensk. Selsk. Skr. 5 ser. 12: 460-483, 595-597. (In Danish with French summary, English translation by W. V. Inman for U.S. Fish Wildl. Serv.: 22 p. typescript).

1881 Spolia Atlantica: Contribution to the knowledge of the changes of form in fishes during growth and development, especially in the pelagic fishes of the Atlantic. Ann. Mag. Nat. Hist., 5(7): 1-4, 107-123.

Maliatskii, S. M.
1940 Materialy po ekologii naseleniia pelagiali Chernogo moria. Trudy Novorossiisk. Biol. Sta. 2(3): 237-258. (In Russian).

Manacop, Porfirio R.
1956 A preliminary systematic study of the Philippine chub mackerels, family Scombridae genera Pneumatophorus and Rastrelliger. Philipp. J. Fish. 4(2): 79-101.

Mann, Walter C.
See Richards *et al.*, 1969a; 1969b; 1970.

Marchal, Emile
1963a Description des stades post-larvaires et juvéniles de *Neothunnus albacora* (Lowe) de l'Atlantique tropico-oriental. FAO Fish. Rep. (6) vol. 3: 1797-1811. (In French).

1963b Description des stades post-larvaires et juvéniles de quatre espèces de *Scombridae* de l'Atlantique tropico-oriental. Mem. Inst. Fr. Afr. Noire (Melanges Ichthyol.) (68): 201-240. (In French).

1963c Exposé synoptique des données biologiques sur la thonine *Euthynnus alleteratus* (Rafinesque) 1810 (Atlantique Oriental et Méditerranée). FAO Fish. Rep. (6) vol. 2: 647-662. (In French).

Marr, John C.
1948 Observations on the spawning of oceanic skipjack (*Katsuwonus pelamis*) and yellowfin tuna (*Neothunnus macropterus*) in the northern Marshall Islands. Fishery Bull. Fish Wildl. Serv. U.S. 51(44): 201-206.

1956 The "critical period" in the early life history of marine fishes. J. Cons. Int.

Explor. Mer 21(2): 160-170.

See also Schaefer and Marr, 1948a; 1948b.

Marukawa, Hisatoshi
1921 On the eggs and larvae of skipjack. Suisankai (J. Fish. Soc. Japan) 479: 476-480. (In Japanese).

1939 Fisheries of the South Sea Islands: Natural food of skipjack and tunas. Nanyo suisan (So. Sea Fish.) 5(7): 12-14. (In Japanese).

See also Okamura and Marukawa, 1909.

Masuda, Shoichi (Ed.)
1963 Katsuo maguro soran (General Review of Tuna and Skipjack). Suisansha, Tokyo: 844 p. (In Japanese).

Mather, Frank J., III
See Watson and Mather, 1961.

Matsubara, Kiyomatsu
1955 Gyorui no keitai to kensaku, (Fish Morphology and Hierarchy). Part 1. Ishizaki shoten, Tokyo: 789 p. (In Japanese).

Matsuda, Seiji
1969 The studies on the fisf (*sic*) eggs and larvae occurred in the Nansei regional waters of Japan — I. Species occurred and there seasonal variation. Bull. Nansei Reg. Fish. Res. Lab. (2): 49-83. (In Japanese with English summary).

Matsui, Tetsuo
1963 The larvae of *Rastrelliger*. *In*: Southeast Asia Research Program, Univ. Calif., Scripps Inst. Oceanogr. (Ed.), Ecology of the Gulf of Thailand and the South China Sea. Univ. Calif. SIO Ref. (63-6): 59-69.

1970 Description of the larvae of Rastrelliger (mackerel) and a comparison of the juveniles and adults of the species R. kanagurta and R. brachysoma. Naga Rep. 5, Part 1,: 33 p.

Matsumoto, Walter M.
1958 Description and distribution of larvae of four species of tuna in central Pacific waters. Fishery Bull. Fish Wildl. Serv. U. S. 58 (128): 31-72.

1959 Descriptions of *Euthynnus* and *Auxis* larvae from the Pacific and Atlantic oceans and adjacent seas. Dana Rep. (50): 34 p.

1960 The application of paper chromatography in identifying tuna larvae. Spec. Scient. Rep. Fish. U.S. Fish Wildl. Serv. (337): 9 p.

1961 Collection and description of juvenile tunas from the central Pacific. Deep Sea Res. 8(3-4): 279-285.

1962 Identification of larvae of four species of tuna from the Indo-Pacific region I. Dana Rep. (55): 16 p.

1963 Unique shape of the first elongate haemal spine of albacore, *Thunnus alalunga* (Bonnaterre). Copeia (2): 460-462.

1966a Distribution and abundance of tuna larvae in the Pacific Ocean. *In*: Thomas A. Manar (Ed.), Proceedings, Governor's Conference on Central Pacific Fishery Resources, State of Hawaii: 221-230.

1966b Identification of tuna larvae. (Abstract). *In*: Biological studies of tunas and sharks in the Pacific Ocean. Proc. Pacif. Sci. Congr. 7: 2.

1968 Morphology and distribution of larval wahoo *Acanthocybium solandri* (Cuvier) in the central Pacific Ocean. Fishery Bull. Fish Wildl. Serv. U.S. 66(2): 299-322.

Matsumoto, Walter M., Witold L. Klawe, William J. Richards, and Shoji Ueyanagi
1966 Working party report on methods of collecting larvae. FAO Expert Panel

for the Facilitation of Tuna Research. FAO Fish. Rep. (37): 20-34.

Matsumoto, W. M., S. Jones, W. L. Klawe, W. J. Richards and S. Ueyanagi
1969 Report of the working party on tuna eggs, larvae and juveniles. *In*: Report of the third session of the FAO Panel of Experts for the Facilitation of Tuna Research. FAO Fish. Rep. (60): 20-23.

Matsumoto, Walter M.
See also Nakamura and Matsumoto, 1966.

Matuda, Seiji
1966 Some consideration on the eggs and larvae of various fishes in Hyuga-Nada and adjacent waters, 1954-64. Rep. Nankai Reg. Fish. Res. Lab. (23): 1-30. (In Japanese with English summary).

Maurin, Claude
See Furnestin *et al.*, 1958.

Mayorova, A. A. and K. S. Tkacheva
1959 Distribution and conditions of reproduction of pelamid (*Sarda sarda*) in the Black Sea according to data for the period 1956-1957. Proc. Tech. Pap. Gen. Fish. Coun. Mediterr. (5): 509-515.

1960 Distribution and conditions of reproduction of pelamid (*Sarda sarda*) in the Black Sea according to the data of the period 1956-1957. Rapp. P.-V. Réun. Commn. Int. Explor. Scient. Mer Méditerr. 15(3): 17-23.

Mead, Giles M.
1951 Postlarval *Neothunnus macropterus, Auxis thazard* and *Euthynnus lineatus* from the Pacific coast of Central America. Fishery Bull. Fish Wildl. Serv. U.S. 52(63): 121-127.

Mel'nichuk, G. L.
1941 Ikrinki i lichinki pelamidy v severozapadnoi chasti Chernogo moria. [Eggs and larvae of the bonito (*Pelamys sarda* C. V.) in the northwestern part of the Black Sea.] Dokl. Akad. Nauk SSSR 30(6): 557-558, 561-562. (In Russian and English).

Merçeron, M.
1970 Note sur les tazars (*Scomberomorus* spp.) des côtes cambodgiennes et leur pêche. Trav. Fac. Sci. Rennes, Sér. Océanogr. Biol. (3): 69-90. (In French).

Meyer, Rudolf
1956 Observatii asupra palamidei in anii 1954-1955 la coastele rominesti. Bul. Inst. Cerc. Pisc. 15(1): 49-54. (In Rumanian with Russian and French summaries).

Mimura, Koya and Staff of the Nankai Regional Fisheries Research Laboratory
1963a Synopsis of biological data on yellowfin tuna *Neothunnus macropterus* Temminck and Schlegel 1842 (Indian Ocean). FAO Fish. Rep. (6) vol. 2: 319-349.

1963b Synopsis of the biology of bigeye tuna *Parathunnus mebachi* Kishinouye 1923 (Indian Ocean). FAO Fish. Rep. (6) vol. 2: 350-379.

Mitchell, Charles T. and John R. Hunter
1970 Fishes associated with drifting kelp, *Macrocystis pyrifera,* off the coast of Southern California and Northern Baja California. Calif. Fish Game 56 (4): 288-297.

Mitchell, Charles T.
See also Hunter and Mitchell, 1966.

Mito, Satoshi
1960 Keys to the pelagic fish eggs and hatched larvae found in the adjacent waters of Japan. Sci. Bull. Fac. Agric. Kyushu Univ. 18(1): 71-94. [In Japanese with an English summary].

1961 Pelagic eggs from Japanese waters — II. Lamprida, Zeida, Mugilina, Scombrina, Carangina and Stromateina. Sci.

Bull. Fac. Agric. Kyushu Univ. 18(4): 451-466. (In Japanese, with English summary).

1966 Nihon Kaiyo Plankton Zukan — Dai 7 Kan — Gyoran — Chigyo. (Japanese Marine Plankton Picture Book — Volume 7 — Fish Eggs — Larvae). Soyosha, Tokyo: 75 p. (In Japanese).

1967 Some ecological notes on the planktonic fish larvae. Inform. Bull. Planktol. Japan (14): 33-49. (In Japanese with English abstract).

See also Uchida *et al.*, 1958.

Mori, Keiichiro

1967a Occurrence of the larvae of *Allothunnus fallai* Serventy in the South Atlantic Ocean. Rep. Nankai Reg. Fish. Res. Lab. (25): 105-111.

1967b Record of occurrence and some notes on young slender-tuna (*Allothunnus fallai* Serventy) from the stomachs of longline tunas and marlins in the South Pacific Ocean. Rep. Nankai Reg. Fish. Res. Lab. (25): 113-120.

1969 Chapter 2. Stomach contents survey of pelagic fish. *In*: Report on Fishing Survey in the Bismarck-Solomon Seas by Shunyo-maru, October-December, 1968. Far Seas Fish. Res. Lab., S Series (1): 8-11 and 166-170. (In Japanese with English synopsis).

1970 A consideration on the spawning of the tunas, especially of the yellowfin tuna (*Thunnus albacares*) in the adjacent sea of the Pacific coast of Japan. Bull. Far Seas Fish. Res. Lab. (3): 215-228. (In Japanese with English synopsis).

Mori, Keiichiro, Yasuo Morita, Yasuo Nishikawa, and Yaeko Furuya

1969 Chapter 4. Research on distribution of coastal fishes. *In*: Report on Fishing Survey in the Bismarck-Solomon Seas by Shunyo-maru, October-December, 1968. Far Seas Fish. Res. Lab., S. Series (1): 18-97 and 166-170. (In Japanese with English synopsis).

Mori, Keiichiro

See also Ueyanagi *et al.*, 1969a; 1969b.

Mori, Tokumi

See Yabe and Mori, 1948; Yabe *et al*; 1953.

Morita, Yasuo

See Mori *et al.*, 1969; Hayasi *et al.*, 1970.

Motoda, Shigeru (Sigeru)

1955a Vertical distribution of eggs of Pacific mackerel in the Ishikari Bay (Survey on the Tsushima warm current in 1954). *In*: Tsushima danryu kaihatsu chosa — kenkyu hokoku 2. (Exploratory Survey on the Tsushima Warm Current — Scientific Report No. 2). Suisancho [(Japan) Fisheries Agency]: 19-22. (In Japanese).

1955b Vertical distribution of mackerel eggs in Ishikari Bay, Hokkaido. Bull. Fac. Fish. Hokkaido Univ. 6(1): 7-11.

Motoda, Sigeru and Masateru Anraku

1955 Occurrence of mackerel eggs in Ishikari Bay, Hokkaido, in June 1954, as investigated by underway plankton catcher. Bull. Fac. Fish. Hokkaido Univ. 6(1): 12-14.

Müller, Alajos

1970 Über das Auftreten von Fischlarven in der Kieler Bucht. Ber. Dt. Wiss. Kommn. Meeresforschung., 21(1-4): 349-368. (In German with abstracts in English, French, and Spanish).

Munro, Ian S. R.

1943a The eggs and early larvae of the Australian barred Spanish mackerel, *Scomberomorus commersoni* (Lacépède) with preliminary notes on the spawning of that species. Proc. R. Soc. Qd. 54(4): 33-48.

1943b Revision of Australian species of *Scomberomorus*. Mem. Qd. Mus. 12

Part 2:65-95.

Murphy, Garth I. and Jerome Pella
1966 Report of the working group on yellowfin tuna. *In*: Thomas A. Manar (Ed.), Proceedings, Governor's Conference on Central Pacific Fishery Resources, State of Hawaii: 29-35.

Murphy, Robert C.
See Nichols and Murphy, 1944.

Myers, George C.
See Herre and Myers, 1937.

Nakamura, Eugene L.
1965 Food and feeding habits of skipjack tuna (*Katsuwonus pelamis*) from the Marquesas and Tuamotu Islands. Trans. Am. Fish. Soc. 94(3): 236-242.

Nakamura, Eugene L. and Walter M. Matsumoto
1966 Distribution of larval tunas in Marquesan waters. Fishery Bull. Fish Wildl. Serv. U.S. 66(1): 1-12. (An erratum issued subsequently states that this publication appeared in January 1967.)

Nakamura, Hiroshi
1959 Introduction (p. 1-27). *In*: Nankai Regional Fisheries Research Laboratory (Ed.). Average year's fishing condition of tuna longline fisheries (text) — 1958 edition. Federation of Japan Tuna Fishermen's Cooperative Associations, Tokyo, 414 p. (In Japanese, partial English translation by G. Y. Beard in the files of the National Marine Fisheries Service, Honolulu).

Nakamura, Hiroshi and Yoshio Hiyama
1957 Recent studies on tunas and marlins in Japan. Proc. Pacif. Sci. Congr. 3: 165-182.

Nakamura, Izumi and Shoji Kikawa
1966 Infra-central grooves of tunas with special reference to the identification of young tunas found in the stomachs of large predators. Rep. Nankai Reg. Fish. Res. Lab. (23): 55-66.

Nakamura Research Staff
1949 Report of investigations of skipjack and tuna resources in 1947. Suisan shikenjo chosa hokoku (Rep. Cent. Fish. Expt. Stn.) (1): 7 p. [In Japanese, English translation *In*: Spec. Scient. Rep. Fish. U.S. Fish Wildl. Serv. (17): 19 p.]

Nankai Regional Fisheries Research Laboratory
1967 Methods for identification of larvae of tuna and billfishes III. Showa 41 nendo maguro gyogyo kenkyu kyogi kai shiryo. (Materials for Tuna Fisheries Research Council for 1966.): 7 p. (In Japanese).

Nayar, K. Nagappan
See Basheeruddin and Nayar, 1962.

Nellen, Walter and Gotthilf Hempel
1970 Beobachtungen am Ichthyoneuston der Nordsee. Ber. Dt. Wiss. Kommn. Meeresforsch. 21(1-4): 311-348. (In German with abstracts in English, French, and Spanish).

Nichols, John T. and Robert C. Murphy
1944 A collection of fishes from the Panama Bight, Pacific Ocean. Bull. Am. Mus. Nat. Hist. (83) Art. (4): 217-260.

Nikolov, Dimo Khr.
1960 Biologiia na palamuda [(*Sarda sarda*) (Bloch)] v Cherno more. (Biology of the bonito, *Sarda sarda* (Bloch) from the Black Sea.) Nauchni Trud. Nauchno-Izsled. Inst. Ribar. Ribna Promishl. 3: 91-115. (In Bulgarian with Russian and German summaries).
See also Georgiev *et al.*, 1963.

Nishikawa, Yasuo
See Mori *et al.*, 1969; Ueyanagi *et al.* 1969a; 1969b.

Nomura, Seizi
1959 On the occurrence and distribution of

larval fishes on the Hyuga Nada during the period from 1956 to 1957. Rep. Nankai Reg. Fish. Res. Lab. (10): 48-62. (In Japanese with English summary).

See also Yokota *et al.*, 1961

Nomura, Shunzo
1952 Tuna fishing investigations by Sagami-maru, South Sea. Kanagawaken suisan shikenjo gyomu hokoku (Prog. Rep. Kanagawa Pref. Fish. Expt. Sta.) for 1951: 1-25. (In Japanese).

Nümann, Wilhelm
1953 Studies on the biology and migrations of young and adult bonitos. Balik Balikç. 1(7): 16 p. (In Turkish).

1955 Growth and migration of short-finned tuna (*Sarda sarda*) in Turkish waters. Proc. Tech. Pap. Gen. Fish. Coun. Mediterr. (3): 377-379. (In French with English abstract).

Ochiai, Akira
1965 Sabarui — magurorui (Mackerels and tunas). Chapter 37,: 763-862. In: Matsubara, Koyomatsu and Akira Ochiai. Gyorui-gaku (Ichthyology) — Part 2. Suisan-gaku zenshu (Fishery Science Series), Tokyo, 19: 1-21 and 343-958. (In Japanese).

Odate, Shigeru
1961 Study on the larvae of the fishes in the north-eastern sea area along the Pacific coast of Japan. Part I. Mackerel, *Pneumatophorus japonicus* (Houttyun). Bull. Tohoku Reg. Fish. Res. Lab. (19): 98-108. (In Japanese with English summary).

Ogawa, Toru
See Hotta and Ogawa, 1955.

Okada, Keisuke
See Ishiyama and Okada, 1957.

Okamura, Kintaro and Hisatoshi Marukawa
1909 Report of the surveys in skipjack fishing grounds. Appendix. Skipjack larvae. Rep. Imp. Fish. Inst. 5(4): 1-18. (In Japanese).

Okiyama, Muneo
1965 Preliminary study on the fish eggs and larvae occurring in the Sado Strait, Japan Sea, with some remarks on the vertical distribution of some fishes. Bull. Jap. Sea Reg. Fish. Res. Lab. (15): 13-37. (In Japanese with English abstract).

Orange, Craig J.
See Schaefer *et al.*, 1963.

Orton, Grace L.
1953a Development and migration of pigment cells in some teleost fishes. J. Morph. 93(1): 69-99.

1953b The systematics of vertebrate larvae. System. Zool. 2(2): 63-75.

Otsu, Tamio
See Ueyanagi *et al.*, 1963; Yoshida and Otsu, 1963.

Oven, L. S.
1959 Pelagischeskie ikrinki ryb v Chernom more u Karadag. (Pelagic fish eggs in the Black Sea off Karadag.) Trudy Karadag Biol. Sta. 15: 13-30. (In Russian, sections pertaining to bonito and bluefin tuna translated into English by W. L. Klawe, Inter-Am. Trop. Tuna Commn. 1968: 5 p.).

Padoa, Emanuele
1956 Divisione: Scombriformes. *In*: 38. Monografia — Uova, larve e stadi giovanili di Teleostei. Fauna Flora Golfo Napoli: 471-521. [In Italian, English translation by John P. Wise and Gabrielle M. Ranallo, "Eggs, larvae and juvenile stages of the Scombriformes (in part) of the Gulf of Naples," Translation No. 12 of the Tropical Atlantic Biological Laboratory, Bur. Comml.

Fish., Miami: 49 p., 1967].

Palekar, V. C.
See Pradhan, 1956.

Panikkar, N. Kesava
1955 Fish and fisheries. *In*: Progress of science in India 1938-1950. (Nat. Inst. Sci. India), Section 7 Zoology Sub Section 3, National Institute of Sciences of India: 1-60.

Parin, N. V.
1967a O sutochnykh izmeneniiakh vstrechaemosti lichinok nekotorykh okeanicheskikh ryb u poverkhnosti vody. Okeanologiia, 7(1): 148-156. (In Russian). Diurnal variations in the larval occurrence of some oceanic fishes near the ocean surface. Oceanology 7(1): 115-121. (In English).

1967b Materialy po rasprostraneniyu i biologii zmeinoi makreli — *Gempylus serpens* Cuv. (Pisces, Gempylidae) v Tikhom i Indiiskom okeanakh. [Material on the distribution and biology of *Gempylus serpens* Cuv. (Pisces, Gempylidae) in the Pacific and Indian Oceans.] Vop. Ihtiol. 7(6): 990-1000. (In Russian).

1968 Ikhtiofauna Okeanskoi Epipelagiali (Ichthyofauna of the Epipelagic Zone). Akademiia Nauk SSSR. Institut Okeanologii, Moscow: 168 p. (In Russian translated in English by U.S. Department of Interior and National Science Foundation, Washington, D.C.: 206 p. Available from U.S. Dept. of Commerce, Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.).

Parona, Corrado
1919 Il tonno e la sua pesca. Memorie R. Com. Talassogr. Ital. 68:1-265. (In Italian).

Parsons, L. S. and V. M. Hodder
1970 Occurrence of juvenile and spawning Atlantic mackerel in south eastern Newfoundland coastal waters. J. Fish. Res. Bd. Can. 27 (11):2097-2100.

Pavlovskaia, R. M.
See Dekhnik and Pavlovskaia, 1950.

Pella, Jerome J.
See Klawe *et al.*, 1970; Murphy and Pella, 1966.

Peter, K. J.
1967 A note on the record of *Rastrelliger* (mackerel) larvae from the Indian Ocean. Curr. Sci. 36(10): 273-274. [*Also* Int. Indian Ocean Exped. Newsl. 4(4): 25-26].

1969a Larvae of *Rastrelliger* (mackerel) from the Indian Ocean. Bull. Natn. Inst. Sci. India, (38), Part 2,: 771-777.

1969b Preliminary report on the density of fish eggs and larvae of the Indian Ocean. Bull. Natn. Inst. Sci. India, (38): 854-863.

Pinkas, Leo
1961 Description of post larval and juvenile bonito from the eastern Pacific Ocean. Calif. Fish Game 47(2): 175-188.

Porumb, Ioan I. and Florica I. Porumb
1959 Contributii la studiul biologiei palamidei (*Sarda sarda* Bloch 1784) din Marea Neagra. Hrana si ritmul de crestere la puiet in dreptul litoralului rominesc. Lucr. Sta. Zool. Marit. Agigea, (volum festiv): 517-526. (In Rumanian with summaries in Russian and French).

Porumb, Florica I.
See Porumb and Porumb, 1959.

Postel, Emile
1962 Les thonides d'Afrique du Nord. Bull. Inst. Pêch. Marit. Maroc (8): 17-27. (In French).

1963a Exposé synoptique des données biologiques sur la bonite à ventre rayé *Katsuwonus pelamis* (Linné) 1758 (A-

tlantique et Méditerranée). FAO Fish. Rep. (6) vol. 2: 515-537. (In French).

1963b Exposé synoptique sur la biologie du germon *Germo alalunga* (Cetti) 1777 (Atlantique Oriental). FAO Fish. Rep. (6) vol. 2: 931-975. (In French).

1964 Les thonides d'Afrique du Nord. Marine Biological Association of India, Proceedings of the Symposium on Scombroid Fishes. Mandapam Camp. Part 1: 211-220. (In French).

Potthoff, Thomas and William J. Richards
1970 Juvenile bluefin tuna, *Thunnus thynnus* (Linnaeus), and other scombrids taken by terns in the Dry Tortugas, Florida. Bull. Mar. Sci. 20(2): 389-413. (In English with Spanish summary).

Pradhan, L. B.
1956 Mackerel fishery of Karwar. (With an appendix by Pradhan, L. B. and V. C. Palekar). Indian J. Fish. 3(1): 141-185.

Randall, John E.
See Richards and Randall, 1967.

Rao, K. Pampapathi
See Rao and Rao, 1957.

Rao, K. Srinivasa
1964 Observations on the food and feeding habits of *Scomberomorus guttatus* (Bloch and Schneider) and juveniles of *S. lineolatus* (Cuvier and Valenciennes) and *S. commerson* (Lacépède) from the Waltair coast. Marine Biological Association of India, Proceedings of the Symposium on Scombroid Fishes. Mandapam Camp, Part 2: 591-598.

Rao, K. Virabhadra
1964 Distribution of the young stages of the mackerel, *Rastrelliger kanagurta* (Cuvier) in the Indian inshore waters. Marine Biological Association of India, Proceedings of the Symposium on Scombroid Fishes. Mandapam Camp, Part 1: 469-482.

Rao, K. Virabhadra and S. Basheeruddin
1953 Occurrence of young mackerel, *Rastrelliger canagurta* (Cuvier) off Madras Coast. Curr. Sci. 22(6): 182-183.

Rao, K. V. Narayana
1964 Observations on the bionomics of the Indian mackerel, *Rastrelliger kanagurta* (C.), caught in the Lawson's Bay, near Waltair; Andhra Coast. Marine Biological Association of India, Proceedings of the Symposium on Scombroid Fishes. Mandapam Camp. Part 2: 574-585.

Rao, K. V. Narayana and K. Pampapathi Rao
1957 Differences in the food of the young and the adult Indian mackerel, *Rastrelliger kanagurta* (Cuv.). Nature 180 (4588): 711-712.

Rathjen, Warren F.
See De Sylva and Rathjen, 1961.

Repelin, R.
See Rossignol and Repelin, 1962.

Richards, William J.
1967 On the distribution and abundance of tuna larvae. (Abstract) *In*: Proceedings of the Symposium on the Oceanography and Fisheries Resources of the Tropical Atlantic. FAO Fish. Rep. (51): 60.

1969a Distribution and relative apparent abundance of larval tunas collected in the tropical Atlantic during Equalant surveys I and II. Proceedings of the Symposium on the Oceanography and Fisheries Resources of the Tropical Atlantic-Review Papers and Contributions UNESCO, Paris: 289-315.

1969b An hypothesis on yellowfin tuna migrations in the eastern Gulf of Guinea. Cah. O.R.S.T.O.M. - Océanog. 7(3): 3-7. (In English with French abstract). Note: author's name mispelled as Richards, Williams J.

Richards, William J., and John E. Randall
1967 First Atlantic records of the narrow-corseleted frigate mackerel, *Auxis thazard.* Copeia (1): 245-247.

Richards, William J., David C. Simmons, Ann Jensen, and Walter C. Mann
1969a Tuna Larvae (Pisces, Scombridae) collected in the northwestern Gulf of Guinea, *Geronimo* Cruise 3, 10 February to 26 April 1964. Data Rep. U.S. Fish Wildl. Serv. (36): 10 p. on 1 microfiche.

1969b Larvae of tuna and frigate mackerel (Pisces, Scombridae) collected in the northwestern Gulf of Guinea, *Geronimo* Cruise 4, 5 August to 13 October 1964. Data Rep. U.S. Fish Wildl. Serv. (37): 17 p. on 1 microfiche.

1970 Larvae of tuna and frigate mackerel (Pisces, Scombridae) in the northwestern Gulf of Guinea and off Sierra Leone, *Geronimo* Cruise 5, 10 February to 19 April 1965. Data Rep. U.S. Fish Wildl. Serv. (40): 24 p. on 1 microfiche.

Richards, William J.
See also Houde and Richards, 1969; 1970; Matsumoto *et al.*, 1966; 1969; Potthoff and Richards, 1970; Sund and Richards, 1965; 1967.

Rivas, Luis Rene
1954 A preliminary report on the spawning of the western North Atlantic bluefin tuna (*Thunnus thynnus*) in the Straits of Florida. Bull. Mar. Sci. Gulf Carib. 4(4): 302-322.

Robins, Jack P.
1963 Synopsis of biological data on bluefin tuna *Thunnus thynnus maccoyii* (Castelnau) 1872. FAO Fish. Rep. (6) vol. 2: 562-587.

Roedel, Phil M.
1949 Notes on the spawning grounds and early life history of the Pacific mackerel. Calif. Fish Game 35(3): 147-153.

See also Fitch and Roedel, 1963.

Roland, J.
See Dieuzeide and Roland, 1955.

Ronquillo, Inocencio A.
1954 Food habits of tunas and dolphins based upon the examination of their stomach contents. Philipp. J. Fish. 2 (1): 71-82.

See also Ueyanagi *et al.*, 1963

Rosa, Horacio, Jr.
See Jones and Rosa, 1965; 1967.

Rossignol, M. and R. Repelin
1962 Note sur *Neothunnus albacora* Lowe et *Parathunnus obesus.* Differenciation des jeunes — Presence d'un trematode parasite des sacs nasaux chez *N. albacora* Lowe. O.R.S.T.O.M. Travaux du Centre Océanographique de Pointe-Noire: 175-178. (In French, translated into English by William J. Richards, Natl. Mar. Fish. Serv., Miami).

Rothschild, Brian J.
1963 Skipjack ecology. *In*: Wilvan G. Van Campen (Ed.), Progress in 1961-62. Circ. U.S. Fish Wildl. Serv., (163): 13-17.

1965 Hypotheses on the origin of exploited skipjack tuna (*Katsuwonus pelamis*) in the eastern and central Pacific Ocean. Spec. Scient. Rep. U.S. Fish Wildl. Serv. (512): 20 p.

See also Sette and Rothschild, 1966.

Roux, Charles H.
1961 Résumé des connaissances actuelles sur *Katsuwonus pelamis* (Linné) Bull. Inst. Pêche. Marit. Maroc (7): 33-53. (In French).

Ryder, John A.
1882 Development of the Spanish mackerel (*Cybium maculatum*). Bull. U.S. Fish Commn. 1: 135-172.

Salabaria, D. (Salabarría D.)
See Dekhnik *et al.*, 1966; Gorbunova and Salabaria, 1967.

Sano, Osamu and Maki Tamura
1958 Distribution of mackerel eggs and fishing for spawning adults in the vicinity of Ishikari Bay. *In*: Tsushima danryu kaihatsu chosa hokokusho — dai 2 hen — ran, chigyo, plankton hen. (Report of exploratory survey on the Tsushima warm current — volume 2 — volume on eggs, larvae and plankton). Suisancho [(Japan) Fisheries Agency] 66-75. (In Japanese).

Sanzo, Luigi
1909a Uova e larve di scomberoidi. Boll. Uff. Minist. Agric. Ind. Comm. Ser. 8, 8(5): 86-87. (In Italian).

1909b Uova e larvae di *Auxis bisus*. Monitore Zool. Ital. 20:79-80. (In Italian, English translation by W. G. Van Campen available from National Marine Fisheries Service, Honolulu, 3 pp.)

1910 Studi sulla biologia del tonno (*Orcynus thynnus* Ltkn.) Boll. Uff. Minst. Agric. Ind. Comm., Ser. 3, 1: 40-45. (In Italian).

1925 Uova e larve di alalonga (*Orcynus germo* Ltkn.) Atti Accad. Naz. Lincei Rc. 1(6) (3): 131-134. (In Italian).

1929 Uova e larve di tonno (*"Orcynus thynnus* Ltkn."). Atti Accad. Naz. Lincei Rc. 9(6): 104-106. (In Italian).

1932a Uova e primi stadi larvali di *Pelamys sarda* C. V. Memorie R. Com. Talassogr. Ital. 188: 3-9. (In Italian).

1932b Uova e primi stadi larvali di tonno (*Orcynus thynnus* Ltkn.). Memorie R. Com. Talassogr. Ital. 189: 1-16. (In Italian).

1933 Uova e primi stadi larvali di alalonga (*Orcynus germo* Ltkn.). Memorie R. Com. Talassogr. Ital. 198: 1-10. (In Italian, English transl. in the files of the National Marine Fisheries Service, Honolulu, Hawaii).

Sarà, R.
1967a Occurrence of bluefin tuna (*Thynnus thynnus*) along the Italian coast. Proc. Tech. Pap. Gen. Fish. Coun. Mediterr. (8): 73-77.

1967b Distribution of bluefin tuna (*Thunnus thynnus*) along the western Sicilian coast. Proc. Tech. Pap. Gen. Fish. Coun. Mediterr. (8): 79-81. (In French with English abstract).

Scaccini, A.
1959 Bio-ecology of young tunas in the seas of Italy. Proc. Tech. Pap. Gen. Fish. Coun. Mediterr. (5): 495-499. (In French with English abstract).

1961a On the phototropism of tunas. Proc. Tech. Pap. Gen. Fish. Coun. Mediterr. (6): 291-292. (In French with English abstract).

1961b Les premiers stades juvéniles du thon rouge (*Thunnus thynnus*). Rapp. P.-V. Réun. Commn. Int. Explor. Scient. Mer Mediterr. 16(2): 351-352. (In French).

1961c Sur la présence et la distribution des jeunes thons dans les mers de Sardaigne. Rapp. P.-V. Réun. Commn. Int. Explor. Sci. Mer Mediterr. 19(2): 353-356. (In French).

1961d Considerations sur les deplacements et la distribution des jeunes thons en Adriatique. Remarks on the deplacements and distribution of young tunas in the Adriatic Sea. Proc. Tech. Pap. Gen. Fish. Coun. Mediterr. (5): 293-294. (In French with English abstract).

1967a Distribution of young tuna in the waters of the Tuscan archipelago related to surface currents. Proc. Tech. Pap. Gen. Fish. Coun. Mediterr. (8):

387-389. (In French with English abstract).

1967b Studio dei caratteri differenziali dei primi stadi in alcune specie di tunnidi. Archo. Zool. Ital. 51: 1053-1061. (In Italian with English summary).

1968 Étude des caractères differentiels des premiers stades dans différentes espèces de thonidés. Rapp. P.-V. Réun. Commn. Int. Explor. Scient. Mer Mediterr. 19: 311-312. (In French).

Schaefer, Milner B.
1948 Spawning of Pacific tunas and its implications to the welfare of the Pacific tuna fisheries. Trans. N. Am. Wildl. Conf. 365-371.

1958 Report on the investigations of the Inter-American Tropical Tuna Commission for the year 1957. Ann. Rep. Inter-Am. Trop. Tuna Commn. 31-134. (In English and Spanish).

1959 Report on the investigations of the Inter-American Tropical Tuna Commission for the year 1958. Ann. Rep. Inter-Am. Trop. Tuna Commn. 34-121. (In English and Spanish).

1960 Report on the investigations of the Inter-American Tropical Tuna Commission for the year 1959. Ann. Rep. Inter-Am. Trop. Tuna Commn. 39-156. (In English and Spanish).

1961 Report on the investigations of the Inter-American Tropical Tuna Commission for the year 1960. Ann. Rep. Inter-Am. Trop. Tuna Commn. 40-183. (In English and Spanish).

Schaefer, Milner B., and John C. Marr
1948a Spawning of yellowfin tuna (*Neothunnus macropterus*) and skipjack (*Katsuwonus pelamis*) in the Pacific Ocean off Central America, with description of juveniles. Fishery Bull. Fish Wildl. Serv. U.S. 51 (44): 187-196.

1948b Juvenile *Euthynnus lineatus* and *Auxis thazard* from the Pacific Ocean off Central America. Pacif. Sci. 2(4): 262-271.

Schaefer, Milner B., Gordon C. Broadhead and Craig J. Orange
1963 Synopsis on the biology of yellowfin tuna *Thunnus* (*Neothunnus*) *albacares* (Bonnaterre) 1788 (Pacific Ocean). FAO Fish. Rep. (6) vol. 2: 538-561.

Schroeder, William C.
See Bigelow and Schroeder, 1963; Hildebrand and Schroeder, 1928.

Sekharan, K. V.
1958 On the South Kanara coastal fishery for mackerel, *Rastrelliger canagurta* (Cuvier) together with notes on the biology of the fish. Indian J. Fish. 5(1): 1-31.

Sella, Massimo
1924 Caratteri differenziali dei giovani stadi di *Orcynus thunnus* Ltkn., *O. alalonga* Risso, *Auxis bisus* Bp. Atti Accad. Naz. Lincei Rc. 33 (3) (1): 300-305. (In Italian, English translation by F. J. S. Lara; 9 p. typescript, in files of Natn. Mar. Fish. Serv., nd.).

Sella, Massimo and O. Ciacchi
1925 Uova e larva dello scombro del Mediterraneo (*Scomber scomber* Linn.) ottenuti per fecondazione artificiale con notizie biologiche. Memorie R. Com. Talassogr. Ital. (114): 52 pp. (In Italian).

Senta, Tetsushi
See Uchida *et al.*, 1958

Serbétis, Christos
1955 Migration of short-finned tunny fish and mackerel from the Aegean Sea. Proc. Tech. Pap. Gen. Fish. Coun. Mediterr. (3): 381-385. (In French with English abstract).

Sette, Oscar Elton
1943 Biology of the Atlantic mackerel

(*Scomber scombrus*) of North America. Part 1: Early life history, including the growth, drift, and mortality of the egg and larval populations. Fishery Bull. Fish Wildl. Serv. U.S. 38: 149-237.

Sette, Oscar Elton and the Staff of P.O.F.I.
1954 Progress in Pacific Oceanic Fishery Investigations 1950-53. Spec. Scient. Rep. Fish. U.S. Fish Wildl. Serv. (116): 75 p.

Sette, Oscar Elton and Brian J. Rothschild
1966 Report of the working group on skipjack tuna. *In*: Thomas A. Manar (Ed.), Proceedings, Governor's Conference on Central Pacific Fishery Resources, State of Hawaii; 17-28.

Sha, Xue-shen, Gui-fen He and Hsiao-wei Chang
1966 A description of the morphological characters of the eggs and larvae of the blue spotted mackerel *Scomberomorus niphonius* (Cuvier & Valenciennes). Oceanologia Limnol. Sin. 8(1):1-8. (In Chinese with English abstract).

Shimada, Bell M.
1951a Contributions to the biology of tunas from the western equatorial Pacific. Fishery Bull. Fish Wildl. Serv. U.S. 52 (62): 111-119.

1951b Juvenile oceanic skipjack from the Phoenix Islands. Fishery Bull. Fish. Wildl. Serv. U.S. 52(64): 129-131.

See also Klawe and Shimada, 1959.

Shimomura, Toshimasa and Hiroshi Fukataki
1957 On the year round occurrence and ecology of eggs and larvae of the principal fishes in the Japan Sea — I. Bull. Jap. Sea Reg. Fish. Res. Lab. (6): 155-290.

Shingu, Chiomi
See Hayasi *et al.*, 1970.

Shirota, Akihiko
1970 Studies on the mouth size of fish larvae. Bull. Jap. Soc. Sci. Fish. 36(4): 355-368. (In Japanese with English summary).

Shojima, Yoichi
See Uchida *et al.*, 1958.

Silas, E. G.
1963a Synopsis of biological data on double-lined mackerel *Grammatorcynus bicarinatus* (Quoy and Gaimard) (Indo-Pacific). FAO Fish. Rep. (6) vol. 2: 811-833.

1963b Synopsis of biological data on an oriental bonito *Sarda orientalis* (Temminck and Schlegel) 1842 (Indian Ocean). FAO Fish. Rep. (6) vol. 2: 834-861.

1964 Aspects of the taxonomy and biology of the oriental bonito *Sarda orientalis* (Temminck and Schlegel). Marine Biological Association of India, Proceedings of the Symposium on Scombroid Fishes. Mandapam Camp, Part 1: 283-308.

See also Jones and Silas, 1960; 1963, 1964.

Simmons, David C.
1969 Maturity and spawning of skipjack tuna (*Katsuwonus pelamis*) in the Atlantic Ocean, with comments on nematode infestation of the ovaries. Spec. Scient. Rep. Fish. U.S. Fish Wildl. Serv. (580):17.

See also Richards et al., 1969a; 1969b; 1970.

Smiley, C. W.
1881 The Spanish Mackerel (*Cybium maculatum*) and its artificial propagation. Proc. Am. Advmt. Sci., 1880: 575-583.

Smith, Hugh M.
1907 Fishes of North Carolina. North Carolina Geological and Economic Survey, Raleigh. 2:453 p.

Smith, J. L. B.
1949 The sea fishes of Southern Africa. Central News Agency Ltd., South Africa: 550 p. Revised edition, same pub-

lisher: 580 p., 1961.

Smith, Paul E.
See Kramer and Smith, 1970.

Smith, W. G.
See Clark *et al.*, 1969.

Šoljan, Tonko
1948 Ribe — Pisces. Fauna Flora Adriat. (1): 438. (In Serbo-Croatian).

1963 Fishes of the Adriatic. Nolit, Belgrade: 428 p. (Enlarged and revised version of the Serbo-Croatian publication which appeared in 1948).

Sotokawa, Magojiro
See Abe *et al.*, 1968.

Sparks, M. Irving
1929 The spawning and development of mackerel on the outer coast of Nova Scotia. Contr. Can. Biol. Fish., n.s. 4: 443-452.

Steven, G. A.
1948 Contributions to the biology of the mackerel *Scomber scombrus* L. Mackerel migrations in the English Channel and Celtic Sea. J. Mar. Biol. Ass. U.K. 27: 517-539.

1949 Contributions to the biology of the mackerel, *Scomber scombrus* L. — II. A study of the fishery in the south-west of England with special reference to spawning, feeding and 'fishermen's signs.' J. Mar. Biol. Ass. U.K. 28: 551-581.

1952 Contributions to the biology of the mackerel, *Scomber scombrus* L. — III. Age and growth. J. Mar. Biol. Ass. U.K. 30: 549-568.

Strasburg, Donald W.
1959 An instance of natural mass mortality of larval frigate mackerel in the Hawaiian Islands. J. Cons. Int. Explor. Mer 24(2): 255-263.

1960 Estimates of larval tuna abundance in the Central Pacific. Fishery Bull. Fish Wildl. Serv. U.S. 60(167): 231-255.

1964 Postlarval scombroid fishes of the genera *Acanthocybium, Nealotus* and *Diplospinus* from the Central Pacific Ocean. Pacif. Sci. 18(2): 174-185.

Suda, Akira
1953 Juvenile skipjack from the stomach contents of tunas and marlins. Bull. Jap. Soc. Scient. Fish. 19(4): 319-340. (In Japanese with English summary).

Sun', Tszi-zhen'
1960 Lichinki i mal'ki tuntsov, parusnikov i mech-ryby (Thunnidae, Istiophoridae, Xiphiidae) tsentral'noi i zapadnoi chasti Tikhogo okeana. [Larvae and juveniles of tunas, sailfishes, and swordfish (Thunnidae, Istiophoridae, Xiphiidae) from the central and western part of the Pacific Ocean]. Trudy Inst. Okeanol. 41: 175-191. (In Russian, English translation by W. L. Klawe, Inter-Am. Trop. Tuna Commn. 18 p., 1960.)

Sund, Paul N. and William J. Richards
1965 Results of trials with a neuston net in the Gulf of Guinea. Ocean Science and Ocean Engineering, Transactions of the Joint Conference and Exhibit Marine Technology Society, American Society of Limnology and Oceanograpry 1: 516-523.

1967 Preliminary report on the feeding habits of tunas in the Gulf of Guinea. Spec. Scient. Rep. Fish. U.S. Fish Wildl. Serv. (551): 6 p.

Tahuku, Masaharu
See Uchida *et al.*, 1958.

Tamari, Tatsuo
See Tanoue and Tamari, 1960.

Tamura, Maki
See Sano and Tamura, 1958.

Tanoue, Toyotaka
1956 A consideration on the spawning-season of the mackerel (*Pneumatophorus tapeinocephalus*) in the southern sea of Kyushu. Mem. Fac. Fish. Kagoshima Univ. 5:42-52. (In Japanese with English summary).

1961 Studies on the relationships between the drifting distribution of mackerel larvae, *Pneumatophorus tapeinocephalus* Bleeker, and the environmental factors — II. On the larvae and the sea conditions in the surface and the middle-layers around the Osumi Island. Bull. Jap. Soc. Scient. Fish. 27(12): 1041-1046. (In Japanese with English summary).

Tanoue, Toyotaka and Tatsuo Tamari
1960 Studies on the relations between the drifting distribution of mackerel-larvae; *Pneumatophorus tapeinocephalus* Bleeker and the environmental factors — I. On the larvae collected and the sea conditions around the Osumi Islands. Bull. Jap. Soc. Scient. Fish. 26(9): 882-886. (In Japanese with English summary).

Tiews, Klaus
1963 Synopsis of biological data on bluefin tuna *Thunnus thynnus* (Linnaeus) 1758 (Atlantic and Mediterranean). FAO Fish. Rep. (6) vol. 2: 422-481.

Tkacheva, K. S.
See Mayorova and Tkacheva, 1959; 1960.

Tominaga, Seijiro
1957 Katsuo — shusei to gyoho. (Skipjack behavior and fishing methods). Ishizaki-shoten Co., Tokyo: 160 p. (In Japanese).

Tongyai, M. L. Prachaksilp
1970 Plah in-see, *Scomberomorus* spp. of Thailand, 1967, pages 557-564. *In*: John C. Marr (Ed.), The Kuroshio — A symposium on the Japan Current. East-West Center Press, Honolulu: 614 p.

Toriyama, Masahiro
See Yokota *et al.*, 1961.

Tracy, Henry C.
1907 The fishes of Rhode Island. III. The fishes of the mackerel family. Thirty-seventh Annual Report of the Commissioners of Inland Fisheries made to the General Assembly at its January Session, State of Rhode Island 1907: 33-64.

Uchida, Keitaro
1954 Pelagic fish eggs and larvae found in the Tsushima warm current. Appendix: Eggs and larvae of Pacific mackerel, jack mackerel, and yellowtail. Tsushima danryu kaihatsu chosa kenkyu hokoku. (Report on Exploratory Survey of Tsushima Warm Current). Suisancho [(Japan) Fisheries Agency] (1): 111-115. (In Japanese).

Uchida, Keitaro and Yoshie Dotsu
1958 General review of fish eggs and larvae found in the surface layer of the region of the Tsushima warm current. *In*: Tsushima danryu kaihatsu chosa hokokusho — dai 2 hen — ran, chigyo, plankton hen. (Report of exploratory survey on the Tsushima warm current — volume 2 — volume on eggs, larvae and plankton). Suisancho [(Japan) Fisheries Agency]: 3-65. (In Japanese). *Note*: Yoshie Datsu and Yosie Datu are transcriptional varieties of the same ideographs.

Uchida, Keitaro, Sadahiko Imai, Satoshi Mito, Shiro Fujita, Masaaki Ueno, Yoichi Shijima, Tetsushi Senta, Masaharu Tahuku, and Yosie Dotu
1958 Studies on the eggs, larvae and juvenile of Japanese fishes. Series 1, Second Laboratory of Fisheries Biology, Fisheries Department, Faculty of Agriculture, Kyushu University, Fukuoka, Japan. 89 p. plus 86 plates. (In Japanese, English translation available from William J. Richards, Natl. Mar. Fish. Serv., Miami). *Note*: Yoshie Dotsu and Yosie Dotu are transcriptional varieties of the same ideographs.

Uchida, Richard N.
1963 Synopsis of biological data on frigate mackerel *Auxis thazard* (Lacépède) 1802 (Pacific Ocean). FAO Fish. Rep. (6) vol. 2: 241-273.

Ueno, Masaaki
See Uchida *et al.*, 1958

Ueyanagi, Shoji
1965 Progress report on the ecological studies of tunas and billfishes. In: Summary of proceedings on tuna fisheries Research Conference, 1964. Tuna Fishg. (34-35): 63-64. (In Japanese).

1966a On the red pigmentation of larval tuna and its usefulness in species identification. Rep. Nankai Reg. Fish. Res. Lab. (24): 41-48. (In Japanese with an English summary).

1966b Part 1. Biology of tunas and billfishes. (Discussion by the audience is included) *In*: Symposium on Tuna Fisheries. Bull. Jap. Soc. Scient. Fish. 32(9): 739-755, and 828. (In Japanese with an English summary).

1967a On the spawning grounds of tunas (magurorui no sanranjo ni tsuite). Tuna Fishg. (60): 15-20. (English translation by the Translation Bureau, Foreign Language Division, Department of the Secretary of State of Canada, Fisheries Research Board of Canada, Translation Series No. 1100, Biological Station St. Andrews, New Brunswick: 14 p.).

1967b On the spawning areas of tunas. *In*: Minutes of Tuna Fisheries Research Conference, 1966. Fisheries Agency (Japan) and Nankai Regional Fisheries Research Laboratory: 237-245. (In Japanese).

1968a Distribution and relative abundance of larval skipjack (*Katsuwonus pelamis*) in the western Pacific Ocean. (Abstract No. 70, p. 55). *In*: J. C. Marr *et al.* (Ed.) Report of the Symposium on the Cooperative Study of the Kuroshio and Adjacent Regions (CSK) — Report and Abstracts of Papers. FAO Fish. Rep. (63): 57 p.

1968b Larval distribution of tunas and billfishes in the Atlantic Ocean. (Abstract No. 4.7, p. 50-51.) *In*: Abstracts of Papers Contributed to the Symposium on Investigations and Resources of the Caribbean Sea and Adjacent Regions. FAO, Rome: 82 p.

1969a The spawning of the southern bluefin tuna (*Thunnus maccoyii*) as indicated by the occurrence of its larvae. Bull. Far Seas Fish. Res. Lab. (1): 1-4. (In Japanese with English synopsis).

1969b Observations on the distribution of tuna larvae in the Indo-Pacific Ocean with emphasis on the delineation of the spawning areas of albacore, *Thunnus alalunga*. Bull. Far Seas Fish. Res. Lab. (2): 177-256. (In Japanese, with English summary).

1969c Larval distribution of tunas and billfishes in the Atlantic Ocean. (Abstract No. 4.9, p. 145). FAO Fish. Rep. (71.1): 165 p.

1970 Distribution and relative abundance of larval skipjack (*Katsuwonus pelamis*) in the western Pacific Ocean, pages 395-398. *In*: John C. Marr (Ed.), The Kuroshio — A Symposium on the Japan Current. East-West Center Press, Honolulu: 614 p.

Ueyanagi, Shoji and Elbert Ahlstrom
1963 Species identification and distribution: Larvae and Eggs. FAO. Fish. Rep. (6) vol. 1: 33-35.

Ueyanagi, Shoji and Hisaya Watanabe
1962 Methods of identification for larval billfishes and young tunas (I). Preliminary Report, Nankai Regional Fisheries Research Laboratory, Kochi, 17 p. (In Japanese).

1964 Methods of identification of larvae of tunas and billfishes (II). Nankai-ku

suisan kenkyu-sho, maguro gyogyo kenkyu kyogikai shiryo (Nankai Regional Fisheries Research Laboratory, Materials for Tuna Fisheries Research Council, Kochi): 16 p. (In Japanese, English translation of sections pertaining to larval tunas by Bur. Comm. Fish., Honolul.)

Ueyanagi, Shoji, Keiichiro Mori and Yasuo Nishikawa
1969a Tuna spawning grounds and potential resources of pelagic fishes based on distribution of larvae (reports on larval research). Tuna Fisheries Research Conference for fiscal year of 1968: 9 p. (In Japanese, English translation by Bur. Comml. Fish., Translations, Washington).

1969b Chapter 3. Research on distribution of larvae. *In*: Report on Fishing Survey in the Bismarck-Solomon Seas by Shunyo-maru, October-December, 1968. Far Seas Fish. Res. Lab., S. Series (1): 12-17 and 166-170. (In Japanese with English synopsis).

Ueyanagi, Shoji, Inocencio A. Ronquillo, and Tamio Otsu
1963 Report of working group 4 — Identification of larvae and juveniles. FAO Fish. Rep. (6) vol. 1: 57-59.

Ueyanagi, Shoji
See also Matsumoto *et al.*, 1966; 1969; Yabe and Ueyanagi, 1962a; 1962b; Yabe *et al.*, 1958; 1963; 1966.

Van Olst, Jon C. and John R. Hunter
1970 Some aspects of the organization of fish schools. J. Fish. Res. Bd. Canada 27(7): 1225-1238.

Venkataraman, G.
1960 Studies on the food and feeding relationships of the inshore fishes off Calicut on the Malabar Coast. Indian J. Fish. 7(2): 275-305.

Verrill, Addison E.
1880 Artificial propagation of the Spanish mackerel (*Cybium maculatum*). Am. J. Sci. ser. 3, 20: 251.

Vijayaraghavan, P.
1955 Life-history and feeding habits of the spotted seer *Scomberomorus guttatus* (Bloch & Schneider). Indian J. Fish. 2(2): 360-372.

Vincent, André
See Furnestin *et al.*, 1958.

Vinohradov, K. O.
1948 Pro stroky nerestuvannia pro lychynky ta pro mal'kiv ryb u Chornomu Mori bilia Karadahu. (Seasons of spawning and occurrence of larvae and juveniles of the Black Sea fishes near Karadag). Dopov. Akad. Nauk URSR (1): 18-24. (In Ukrainian, English translation by W. L. Klawe, Inter-Am. Trop. Tuna Commn.: 9 p., 1971).

Vodianitskii, V. A.
1936 Nablyudenia nad pelagicheskimi iaitsami ryb Chernogo moria (Observations on pelagic eggs of fishes of the Black Sea). Trudy Sevastopol'. Biol. Sta. 5: 3-43. (In Russian, with German summary; pp. 23-26 translated into English by W. L. Klawe, Inter-Am. Trop. Tuna Commn.: 10 p.).

1939 K izucheniyu biologi pelagicheskoi oblasti Chernogo moria. (Concerning the study of the biology of the Black Sea pelagic region.) Priroda (4): 69-71. (In Russian).

Vodianitskii, V. A. and I. I. Kazanova
1954 Opredelitel' pelagicheskikh ikrinok i lichinok ryb Chernogo moria. (Diagnostic description of the eggs and larvae of the Black Sea fishes.) Trudy VNIRO, 28: 240-323. (In Russian, English translation of sections pertaining to bonito and bluefin tuna by W. L. Klawe, Inter-Am. Trop. Tuna Commn.: 7 p., 1969).

Wade, Charles B.
1949 Notes on the Philippine frigate mackerels family Thunnidae, genus *Auxis*.

Fishery Bull. Fish Wildl. Serv. U.S. 51 (46): 229-240.

1950 Juvenile forms of *Neothunnus macropterus, Katsuwonus pelamis* and *Euthynnus yaito* from Philippine seas. Fishery Bull. Fish Wildl. Serv. U.S. 59 (53): 395-404.

1951 Larvae of tuna and tuna-like fishes from Philippine waters. Fishery Bull. Fish Wildl. Serv. U.S. 51 (57): 445-485.

Waldron, Kenneth D.
1963 Synopsis of biological data on skipjack *Katsuwonus pelamis* (Linnaeus) 1758 (Pacific Ocean). FAO Fish. Rep. (6) vol. 2: 695-748.

Watanabe, Hisaya
1958 On the difference of stomach contents of the yellowfin and bigeye tunas from the western equatorial Pacific. Rep. Nankai Reg. Fish. Res. Lab. (7): 72-81. (In Japanese with English summary).

1962 Frigate mackerels (genus *Auxis*) from the stomach contents of tunas and marlins. Rep. Nankai Reg. Fish. Res. Lab. (16): 155-171. (In Japanese with English summary).

1964 Frigate mackerels (genus *Auxis*) from the stomach contents of tunas and marlins. Marine Biological Association of India, Proceedings of the Symposium on Scombroid Fishes. Mandapam Camp. Part 2: 631-642.

See also Ueyanagi and Watanabe, 1962; 1964; Yabe *et al.*, 1958; 1966.

Watanabe, Hisaya, Mori Yukinawa, Sumiko Nakazawa and Shoji Ueyanagi
1966 On the larvae probably referable to slender tuna, *Allothunnus fallai* Serventy. Rep. Nankai Reg. Fish. Res. Lab. (23): 85-94. (In Japanese with English summary).

Watanabe, Taisuke
1970 Morphology and ecology of early stages of life in Japanese common mackerel, *Scomber japonicus* Houttuyn, with special reference to fluctuation of population. Bull. Tokai Reg. Fish. Res. Lab. (62): 1-238. (In Japanese with English summary).

Watson, M.
1962 Tuna larvae. Oceanus 9 (1): 19.

Watson, Margaret E.
1964 Tunas (genus *Thunnus*) of the Western North Atlantic. Part 1. Key to the species of *Thunnus* based on skeletal and visceral anatomy. Marine Biological Association of India, Proceedings of the Symposium on Scombroid Fishes. Mandapam Camp. Part 1: 389-394.

Watson, Margaret E. and Frank J. Mather III
1961 Species identification of juvenile tunas (genus *Thunnus*) from the Straits of Messina, Northwestern Atlantic and the Gulf of Mexico, p. 40. *In*: J. C. Marr (Ed.) Pacific Tuna Biology Conference — August 14-19, 1961 — Honolulu, Hawaii, Spec. Scient. Rep. Fish. U.S. Fish Wildl. Serv. (415): 45 p.

Weeks, Ann
1970 Bureau of Commercial Fisheries — Tropical Atlantic Biological Laboratory — Progress in research 1965-'69 — Miami, Florida. Circ. U.S. Fish Wildl. Serv. (344): 65 p.

Welsh, William W.
See Bigelow and Welsh, 1925.

Wickstead, John H.
1965 An Introduction to the Study of Tropical Plankton. Hutchinson Tropical Monographs. Hutchinson, London: 160 p.

Williams, Francis
1963a Synopsis of biological data on frigate mackerel *Auxis thazard* (Lacépède) 1802 (Indian Ocean). FAO Fish. Rep. (6) vol. 2: 157-166.

1963b Synopsis of biological data on little tuna *Euthynnus affinis* (Cantor) 1850 (Indian Ocean). FAO Fish. Rep. (6) vol. 2: 167-179.

1964 The scombroid fishes of East Africa. Marine Biological Association of India, Proceedings of the Symposium on Scombroid Fishes. Mandapam Camp, Part 1: 107-164.

Wollam, Michael B.
1969 Larval wahoo, *Acanthocybium solanderi* (Cuvier), (Scombridae) from the Straits of Yucatan and Florida. Leafl. Ser. Mar. Res. Lab. Fla. Dept. Nat. Resour. 4, pt. 1 (Pisces) (12): 7 p.

1970 Description and distribution of larvae and early juveniles of king mackerel, *Scomberomorus cavalla* (Cuvier), and Spanish mackerel, *Scomberomorus maculatus* (Mitchill); (Pisces: Scombridae), in the Western North Atlantic. Tech. Ser. Mar. Res. Lab. Fla. Dept. Nat. Resour. (61): 35 p.

Wood, W. M.
1885 Reports on operations in hatching eggs of Spanish mackerel in Chesapeake Bay by Steamer 'Fish Hawk' during summer of 1883. Rep. U.S. Commnr. Fish. 11: 1089-1094.

Yabe, Hiroshi
1953a The post-larva and the young-fish presumably identified as *Scomber tapeinocephalus*. (A preliminary report.) Contr. Nankai Reg. Fish Res. Lab. (1): 1-5. (In Japanese with an English summary).

1953b Juveniles collected from south seas by Tenyo Maru at her second tuna research voyage (Preliminary Report). Contr. Nankai Reg. Fish. Res. Lab. (1), Contr. 25: 1-14. (In Japanese).

1954 Spawning ecology of tunas. *In*: Summary report of the second lecture series on tuna fisheries. Tuna Fishg. (13): 50. (In Japanese).

1955 Studies on the fish larvae in the western Pacific Ocean. 1. The post-larvae of *Katsuwonus pelamis*. Bull. Jap. Soc. Scient. Fish. 20(12): 1054-1059. Also reprinted *In*: Rep. Nankai Reg. Fish. Res. Lab. (4), 1956 with original pagination. (In Japanese with English summary).

Yabe, Hiroshi, Noboru Anraku and Tokumi Mori
1953 Scombroid youngs found in the coastal seas of Aburatsu, Kyushu, in summer. Contr. Nankai Reg. Fish. Res. Lab. (11): 10 p. (In Japanese).

Yabe, Hiroshi and Tokumi Mori
1948 Report of skipjack investigations for 1947. Suisan shikenjo chosa Hokoku. (Rep. Cent. Fish. Expt. Stn.) (30). (In Japanese).

Yabe, Hiroshi and Shoji Ueyanagi
1962a Contribution to the study of the early life history of the tunas. Occ. Rep. Nankai Reg. Fish. Res. Lab. (1): 57-72.

1962b Contribution to the study of the early life history of the tunas, p. 40-41 (Abstract). *In*: J. C. Marr (Ed.) Pacific Tuna Biology Conference — August 14-19, 1961 — Honolulu, Hawaii. Spec. Scient. Rep. Fish. U.S. Fish Wildl. Serv. (415): 55 p.

Yabe, Hiroshi, Yoichi Yabuta and Shoji Ueyanagi
1963 Comparative distribution of eggs, larvae and adults in relation to biotic and abiotic environmental factors. FAO Fish. Rep. (6) vol. 3: 979-1009.

Yabe, Hiroshi, Shoji Ueyanagi and Hisaya Watanabe
1966 Studies on the early life history of bluefin tuna *Thunnus thynnus* and on the larva of the southern bluefin tuna *T. macoyii*. Rep. Nankai Reg. Fish. Res. Lab. (23): 95-129. (In Japanese with an English summary).

Yabe, Hiroshi, Shoji Ueyanagi, Shoji Kikawa, and Hisaya Watanabe
1958 Young tuna found in the stomach con-

tents. Rep. Nankai Reg. Fish. Res. Lab. (8): 31-48. (In Japanese with English summary, English translation in files of U.S. Natl. Mar. Fish. Serv., Washington).

Yabuta, Yoichi
1953 On the stomach contents of tuna and marlin from the adjacent seas of Bonin Islands. Contr. Nankai Reg. Fish. Res. Lab. (1), Contr. 15. 1-6. (In Japanese).

See also Yabe *et al.*, 1963.

Yamanaka, Ichiro
1966 Part III. Fishing ground and oceanography. *In*: Symposium on Tuna Fisheries. Bull. Jap. Soc. Scient. Fish. 32(9): 787-803, 830-831. (In Japanese with English summary).

Yamanaka, Hajime and Staff of the Nankai Regional Fisheries Research Laboratory.
1963 Synopsis of biological data on kuromaguro *Thunnus orientalis* (Temminck and Schlegel) 1842 (Pacific Ocean). FAO Fish. Rep. (6) vol. 2: 217.

Yamauti, Minoru
See Inoue *et al.*, 1970

Yokota, Takio, M. Toriyama, F. Kanai and S. Nomura
1961 Studies on the feeding habit of fishes. Rep. Nankai Reg. Fish. Res. Lab. (14): 234 p. (In Japanese with English summary).

Yoshida, Howard O.
1965 New Pacific records of juvenile albacore, *Thunnus alalunga* (Bonnaterre) from stomach contents. Pacif. Sci. 19 (4): 442-450.

1968 Early life history and spawning of the albacore, *Thunnus alalunga*, in Hawaiian waters. Fishery Bull. Fish Wildl. Serv. U.S. 67(2): 205-211.

Yoshida, Howard O. and Tamio Otsu
1963 Synopsis of biological data on albacore *Thunnus germo* (Lacépède) 1800 (Pacific and Indian Oceans). FAO Fish. Rep. (6) vol. 2: 274-318.

Zharov, Viktor L. and A. M. Zhudova
1967 Nekotorye dannye o vstrechaemosti lichinok skombroidnykh (otriad Perciformes, podotriad Scombroidei) v otkrytoi chast tropicheskoi Atlantiki. [Some data on occurrence of scombroid larvae (Order Perciformes, Suborder Scombroidei) in the open waters of the tropical Atlantic.] Trudy AtlantNIRO (18): 201-214. (In Russian, English translation by W. L. Klawe, Inter-Am. Trop. Tuna Commn.: 21 p., 1969).

Zhudova, A. M.
1969a Lichinki skombroidnykh ryb (Scombroidei, Perciformes) tsentral'noi chasti Atlanticheskogo okeana. [Larvae of scombrid fishes (Scombroidei, Perciformes) from the central portion of the Atlantic Ocean.] Trudy AtlantNIRO (25): 100-108. (In Russian, English translation by W. L. Klawe, Inter-Am. Trop. Tuna Commn.: 17 p., 1970).

1969b Materialy po izucheniyu ikry i lichinok nekotorykh vidov ryb Gvineiskogo zaliva i prilegayushchikh vod othrytoi chasti okeana. (Materials on the study of the eggs and larvae of some species of fish from the Gulf of Guinea and the adjacent waters of the open ocean). Trudy AtlantNIRO (22): 135-163. (In Russian, English translation by W. L. Klawe, Inter-Am. Trop. Tuna Commn.: 38 p, 1971).

See also Zharov and Zhudova, 1967

Zusser, S. G.
1954 Biologia i promysel pelamidy v Chernom more. Trudy VNIRO 28: 160-174. (In Russian).

Zviagina, O. A.
1961 Raspredelenie ikry skumbrii (Pneumatophorus japonicus (Houttuyn)) i pelingasa (Mugil so-iuy Basilewsky) v zalive Petra Velikogo. Trudy Inst. Okeanologii 43:328-336. [In Russian].

JOURNAL TITLES WITH ABBREVIATIONS
TITULOS DE REVISTAS CON ABREVIACIONES
TITRES DES JOURNAUX AVEC ABBREVIATIONS
ZEITSCHRIFTEN MIT ABKURZUNGEN

Av. Abstr. Contr. Fish. Aquat. Sci. India.
Advance abstracts of Contributions on Fisheries and Aquatic Sciences in India. Central Marine Fisheries Research Institute (India). Mandapam Camp.

Am. J. Sci.
American Journal of Science. New Haven, Connecticut.

Ann. Mag. Nat. Hist.
Annals and Magazine of Natural History. London.

Ann. Rep. Inter-Am. Trop. Tuna Comm.
Annual Report of the Inter-American Tropical Tuna Commission. Informe Annual de la Comisión Interamericana del Atún Tropical. La Jolla, California.

Annls. Scient. Univ. Jassy.
Annales Scientifiques de l'Université de Jassy. Jassy, Romania.

Archo. Zool. Ital.
Archivio Zoologico Italiano. Milan.

Atti Accad. Naz. Lincei Rc.
Atti dell'Academia Nacionale dei Lincei. Rendiconti. Classe di Scienze Fisiche, Matematiche e Naturali. Rome.

Balik Balikç.
Balik ve Balikçilik. Istanbul.

Ber. Dt. Wiss. Kommn. Meeresforsch.
Berichte der Deutschen Wissenschaftlichen Kommission für Meeresforschung. Paul Parey, Hamburg.

Boletín, Comisión Interamericana del Atún Tropical.
See Bull. Inter-Am. Trop. Tuna Commn.

Boll. Pesca Piscic. Idrobiol.
Bolletino di Pesca, Piscicoltura e Idrobiologia. Rome.

Boll. Uff. Minist. Agric. Ind. Comm.
Bollettino Ufficiale del Ministero d'Agricoltura, Industria e Commercio. Rome.

Boln. Inst. Esp. Oceanogr.
Boletín del Instituto Español de Oceanografía. Madrid.

Bull. Am. Mus. Nat. Hist.
Bulletin of the American Museum of Natural History. New York.

Bull. Bur. Fish. Wash.
Bulletin of the Bureau of Fisheries. Washington, D.C.

Bull. Fac. Fish. Hokkaido Univ.
Bulletin of the Faculty of Fisheries, Hokkaido University. Hokkaido daigaku, suisan gakubu kenkyu i ho. Hokodate City, Japan.

Bull. Fac. Fish. Nagasaki Univ.
Bulletin of the Faculty of Fisheries, Nagasaki University. Nagasaki daigaku, suisan gakka hokoku. Sasebo City, Japan.

Bull. Far Seas Fish. Res. Lab.
Bulletin. Far Seas Fisheries Research Laboratory. Enyo suisan kenkyusho kenkyu hokoku. Shimizu City, Japan.

Bul. Inst. Cerc. Pisc.
Buletinul Institutului de Cercetări Piscicole. Bucharest.

Bull. Inst. Pêch. Marit. Maroc.
Bulletin de l'Institut des Pêches Maritimes du Maroc. Rabat, Casablanca.

Bull. Inst. Fr. Afr. Noire.
Bulletin de l'Institut Française d'Afrique Noire. Paris, Dakar.

Bull. Inter-Am. Trop. Tuna Commn.
Bulletin. Inter-American Tropical Tuna Commission. Boletín. Comisión Interamericana del Atún Tropical. La Jolla, California.

Bull. Jap. Sea Reg. Fish. Res. Lab.
Bulletin of the Japan Sea Regional Fisheries Research Laboratory. Nihonkaiku suisan kenkyu-sho kenkyu hokoku. Niigata City.

Bull. Jap. Soc. Scient. Fish.
Bulletin of the Japanese Society of Scientific Fisheries. Nihon suisan gakkai-shi. Tokyo.

Bull. Jap. Soc. Fish. Oceanogr.
Bulletin of the Japanese Society of Fisheries Oceanography. Suisan kaiyo kenkyu-kai kaiho. Tokyo.

Bull. Mar. Sci.
Bulletin of Marine Science of the Gulf and Caribbean. *Afterwards* Bulletin of Marine Science. Miami, Florida.

Bull. Mar. Sci. Gulf Caribb.
See Bull. Mar. Sci.

Bull. Mus. Natn. Hist. Nat. Paris.
Bulletin du Muséum National d'Histoire Naturelle. Paris.

Bull. Nansei Reg. Fish. Res. Lab.
Bulletin of the Nansei Regional Fisheries Research Laboratory. Nansei-kaiku suisan kenkyu-sho, kenkyu hokoku. Hiroshima City.

Bull. Natn. Inst. Sci. India.
Bulletin of the National Institute of Sciences of India. New Delhi.

Bull. Peabody Mus. Nat. Hist.
Bulletin of the Peabody Museum of Natural History. New Haven, Connecticut.

Bull. Raffles Mus.
Bulletin of the Raffles Museum. Singapore.

Bull. Scripps Instn. Oceanogra. Tech. Ser.
Bulletin of the Scripps Institution of Oceanography. Technical Series. University of California San Diego, La Jolla, California.

Bull. Stn. Aquic. Pêche Castiglione.
Bulletin Station d'Aquiculture et de Pêche de Castiglione. Algiers.

Bull. Stn. Océanogr. Salammbô.
Bulletin Station Océanographique de Salammbô. Tunis.

Bull. Tohoku Reg. Fish. Res. Lab.
Bulletin of Tohoku Regional Fisheries Research Laboratory. Tohoku kaiku suisan kenkyusho kenkyu hokoku. Shiogama City, Japan.

Bull. Tokai Reg. Fish. Res. Lab.
Bulletin of Tokai Regional Fisheries Research Laboratory. Tokaiku suisan kenkyusho kenkyu hokoku. Tokyo.

Bull. U.S. Fish Commn.
Bulletin of the United States Fish Commission. Washington, D.C.

Cah. ORSTOM — Oceanog.
Cahiers Orstom — Serie Océanographie. Office de la Recherche Scientifique et Techniques Outre-Mer. Paris.

Calif. Fish Game.
California Fish and Game. Sacramento, California.

Ciencia, Méx.
Ciencia. Revista Hispano-Americana de Ciencias Puras y Aplicadas. México, D.F.

Circ. U.S. Natn. Mar. Fish. Serv.
Circular. United States Department of Commerce, National Marine Fisheries Service. *Formerly* Circular. United States Department of Interior, Fish and Wildlife Service. Washington, D.C. *See* Circ. U.S. Fish Wildl. Serv.

Circ. U.S. Fish Wildl. Serv.
Circular. United States Department of Interior, Fish and Wildlife Service. *Afterwards* Circular. United States Department of Commerce, National Marine Fisheries Service. Washington, D.C. *See* Circ. U.S. Natn. Mar. Fish. Serv.

Comml. Fish. Rev.
Commercial Fisheries Review. United States Department of Interior, Fish and Wildlife Service. Washington, D.C.

Contr. Can. Biol. Fish.
Contributions to Canadian Biology and Fisheries. Ottawa.

Contr. Mar. Fish. Lab. Thailand.
Contributions of the Marine Fisheries Laboratory. Department of Fisheries Thailand. Bangkok.

Contr. Nankai Reg. Fish. Res. Lab.
Contributions. Nankai Regional Fisheries Research Laboratory. Nankai-ku suisan kenkyusho gyoseki-shu. Kochi City, Japan.

Copeia.
Copeia. New York, etc.

C. R. Hebd. Séanc. Acad. Sci., Paris.
Compte Rendu Hebdomadaire des Séances de l'Académie des Sciences. Paris.

Curr. Sci.
Current Science. Bangalore, India.

Dana Rep.
Dana Reports. Carlsberg Foundation. Copenhagen.

Data Rep. Inter-Am. Trop. Tuna Commn.
Data Report. Inter-American Tropical Tuna Commission. La Jolla, California.

Data Rep. U.S. Fish Wildl. Serv.
Data Report. Fish and Wildlife Service. United States Department of Interior. Washington, D.C.

Deep Sea Res.
Deep Sea Research. London.

Doc. Sci. Prov. ORSTOM, Dakar.
Document Scientifique Provisoire. Office de la Recherche Scientifique et Technique Outre-Mer. Centre de Recherches Océanographiques de Dakar-Thiaroye. Senegal.

Dokl. Akad. Nauk SSSR.
Doklady Akademii Nauk SSSR. Moscow, Leningrad.

Dopov. Akad. Nauk URSR.
Dopovidi Akademiyi Nauk URSR (Viddil Biolochichnykh Nauk). Kiev.

Enyo suisan kenkyu-sho kenkyu hokoku.
See Bull. Far Seas Res. Lab.

Enyo suisan kenkyu-sho, S Series.
See Far Seas Fish. Res. Lab., S. Series.

FAO Fish. Rep.
Fisheries Report. Food and Agriculture Organization of the United Nations. Rome. (*In Citations of this publication the number of the issue precedes the volume.*)

FAO Fish. Synops.
Fisheries Synopses. Food and Agriculture Organization of the United Nations. Rome.

Far Seas Fish. Res. Lab., S Series.
Far Seas Fisheries Research Laboratory — S Series. Enyo suisan kenkyu-sho — S Series. Shimizu City, Japan.

Fauna Flora Adriat.
Fauna et Flora Adriatica. Fauna i Flora Jadrana. Institut za Oceanografiju i Ribarstvo. Split, Yugoslavia.

Fauna i Flora Jadrana.
See Fauna Flora Adriat.

Fauna Flora Golfo Napoli.
Fauna e Flora del Golfo di Napoli. Stazione Zoologica di Napoli. Naples.

Fish. Sci. Ser.
Fishery Science Series. Suisan-gaku zenshu. Tokyo.

Fishery Bull. Fish Wildl. Serv. U.S.
Fishery Bulletin. Fish and Wildlife Service. United States Department of Interior. Washington, D.C.

Fish. Sci. Tokyo.
Fisheries Science. Suisan kagaku. Tokyo.

Gyoruigaku zasshi.
See Jap. J. Ichthyol.

Hai-yang yu hu-chao.
See Oceanolgia Limnol. Sin.

Hokkaido daigaku, suisan gakubu kankyu i ho.
See Bull. Fac. Fish. Hokkaido Univ.

Indian J. Fish.
Indian Journal of Fisheries. New Delhi.

Informe Anual. Comisión Interamericana del Atún Tropical.
See Ann. Rep. Inter-Am. Trop. Tuna Commn.

Inform. Bull. Planktol. Japan.
Information Bulletin on Planktology in Japan. Nihon purankuton kenkyu renraku kaiho. Hakodate City.

Int. Congr. Zool. 12. Lisbon.
(12th) International Congress of Zoology. Lisbon.

Int. Indian Ocean Exped. Newsl.
International Indian Ocean Expedition Newsletter. Indian National Committee on Oceanic Research, Council of Scientific and Industrial Research. New Delhi.

Int. Revue Ges. Hydrobiol. Hydrogr.
Internationale Revue der Gesamten Hydrobiologie und Hydrographie. Leipzig.

Issled. Dal'nevost. Morei SSSR.
Issledovaniia Dal'nevostochnykh Morei SSSR. Moscow.

Izvješća. Institut za Oceanografiju i Ribarstvo. Split, Yugoslavia.

Izv. TINRO.
Izvestiia Tikhookeanskogo Nauchno-issledovatel'skogo Instituta Rybnogo Khoziaistva i Okeanografii. Vladivostok, Moscow, etc.

Izv. Tsent. Nauchnoizsled. Inst. Ribov. Ribol. Varna.
Izvestiia na Tsentralniia Nauchnoizsledovatelski Institut po Ribov"dstvo i Ribolov — Varna. B"lgarska Akademiia na Naukite. Sofia.

Jap. J. Ichthyol.
Japanese Journal of Ichthyology. Gyoruigaku zasshi. Tokyo.

J. Coll. Agric. Imp. Univ. Tokyo.
Journal of the College of Agriculture, Imperial University of Tokyo, Tokyo.

J. Coll. Mar. Sci. Technol. Tokai Univ.
Journal of the College of Marine Science and Technology. Tokai University. Tokai Daigaku kiyo kaiyo gakubu. Shimizu City, Japan.

J. Cons. Int. Explor. Mer.
Journal du Conseil. Conseil Permanent International pour l'Exploration de la Mer. Copenhagen.

J. Fac. Sci. Tokyo Univ.
Journal of the Faculty of Science, Tokyo University. Tokyo.

J. Fish. Res.
Journal of the Fisheries Research. Suisan Kenkyu-shi. Tokyo.

J. Fish. Res. Bd. Can.
Journal of the Fisheries Research Board of Canada. Ottawa.

J. Fish. Res. Inst. Tokyo.
Journal of the Fisheries Research Institute. Suisan kenkyu-kai ho. Tokyo.

J. Fish. Soc. Japan.
Journal of the Fisheries Society of Japan. Suisankai. Tokyo.

J. Ichthyol.
Journal of Ichthyology *formerly* Problems of Ichthyology. American Fisheries Society. Washington, D.C. *English translation* of Voprosy Ikhtiologii *see* Vop. Ikhtiol. *and* Probl. Ichthyol.

J. Imp. Fish. Inst.
See J. Tokyo Univ. Fish. — Journal of the Imperial Fisheries Institute. Suisan koshujo

kenkyu hokoku. *Afterwards* Journal of the Tokyo College of Fisheries. Tokyo suisan daigaku kenkyu hokoku. Yokosuka City.

J. Madras Univ.
Journal of the Madras University. Madras.

J. Mar. Biol. Ass. India.
Journal of the Marine Biological Association of India. Mandapam Camp, Madras.

J. Mar. Biol. Ass. U.K.
Journal of the Marine Biological Association of the United Kingdom. Plymouth.

J. Morph.
Journal of Morphology. Philadelphia, etc.

J. Shimonoseki Coll. Fish.
Journal of the Shimonoseki College of Fisheries, Ministry of Agriculture and Forestry. Norinsho, suisan koshujo kankyu hokoku. Shimonoseki City.

J. Tokyo Coll. Fish.
See J .Tokyo Univ. Fish. Journal of the Tokyo College of Fisheries *afterwards* Journal of the Tokyo University of Fisheries. Yokosuka City.

J. Tokyo Univ. Fish.
Journal of the Tokyo University of Fisheries. Tokyo suisan daigaku kenkyu hokoku. Yokosuka City, etc.

J. Zool. Soc. India.
Journal of the Zoological Society of India. Calcutta.

Kagaku nanyo.
See So. Sea Sci.

Kagoshima daigaku, suisan gakubu kiyo.
See Mem. Fac. Fish. Kagoshima Univ.

Kagoshima-ken suisan shikenjo jigyo hokoku.
See Prog. Rep. Kagoshima Pref. Fish. Expt. Stn.

K. Danske Vidensk. Selsk. Skr.
Kongelige Danske Videnskabernes Selskabs Skrifter. Copenhagen.

Kieler Meeresforsch.
Kieler Meeresforschungen. Institut für Meereskunde der Universität Kiel. Kiel.

Kyushu daigaku nogakubu gakugei zasshi.
See Sci. Bull. Fac. Agric. Kyushu Univ.

Leafl. Ser. Mar. Res. Lab. Fla. Dep. Nat. Resour.
Leaflet Series. Marine Research Laboratory. Florida Department of Natural Resources. St. Petersburg, Florida.

Lucr. Sta. Zool. Marit. Agigea.
Lucrările ale Statiei Zoologice dela Agigea. Agigea, Romania.

Maguro gyogyo.
See Tuna Fishg.

Mém. Inst. Fr. Afr. Noire (Mélanges Ichthyol.).
Mémoires de l'Institut Français d'Afrique Noire. Mélanges Ichthyologiques. Paris, France and Dakar, Senegal.

Mem. Fac. Fish. Kagoshima Univ.
Memoirs of the Faculty of Fisheries, Kagoshima University. Kagoshima daigaku, suisan gakubu kiyo. Kagoshima City.

Mem. Qd. Mus.
Memoirs of the Queensland Museum. Brisbane.

Memorie R. Com. Talassogr. Ital.
Memorie. R. Comitato Talassografico Italiano. Venice.

Mondo Sommerso.
Mondo Sommerso. Rome.

Monitore Zool. Ital.
Monitore Zoologico Italiano. Florence.

Monogr. Acad. Nat. Sci. Philad.
Monographs. Academy of Natural Sciences of Philadelphia. Philadelphia, Pennsylvania.

Naga Rep.
Naga Report. Scientific Results of Marine Investigations of the South China Sea and the

Gulf of Thailand — 1959-1961. University of California, Scripps Institution of Oceanography. La Jolla, California.

Nagasaki daigaku, suisan gakka hokoku.
See Bull. Fac. Fish. Nagasaki Univ.

Nankai-ku suisan kenkyusho gyoseki-shu.
See Contr. Nankai Reg. Fish. Res. Lab.

Nankai-ku suisan kenkyusho hokoku.
See Rep. Nankai Reg. Fish. Res. Lab.

Nankai-ku suisan kenkyusho hokoku, rinjigo.
See Occ. Rep. Nankai Reg. Fish. Res. Lab.

Nansei-kaiku suisan kenkyusho, kenkyu hokoku.
See Bull. Nansei Reg. Fish. Res. Lab.

Nanyo suisan joho.
See So. Sea Fish. News.

Nanyo suisan.
See So. Sea Fish.

Nature.
Nature. London.

Nauchni Trud. Nauchno-Izsled. Inst. Ribar. Ribna Promishl.
Nauchni Trudove. Nauchno-Izsledovatelski Institut po Ribarstvo i Ribna Promishlenost — Varna. Sofia.

Nihon-kaiku suisan kenkyu-sho kenkyu hokoku.
See Bull. Jap. Sea Reg. Fish. Res. Lab.

Nihon purankuton kenkyu renraku kaiho.
See Inform. Bull. Planktol. Japan.

Nihon suisan gakkai-shi.
See Bull. Jap. Soc. Scient. Fish.

Nihon suisan shigen hogo kyokai, suisan kenkyu sosho.
See Study Ser. Jap. Fish. Resor. Conserv. Ass.

Norinsho, suisan koshujo kenkyu hokoku.
See J. Shimonoseki Coll. Fish.

Notas Resúm. Inst. Esp. Oceanogr.
Notas y Resúmenes. Instituto Español de Oceanografía. Madrid.

Occ. Rep. Nankai Reg. Fish. Res. Lab.
Occasional Reports. Nankai Regional Fisheries Research Laboratory. Nankaiku suisan kenkyusho hokoku, rinjigo. Kochi City. Japan.

Oceanology.
Oceanology. American Geophysical Union. Washington, D.C. *English translation of* Okeanologiia *see* Okeanologiia.

Oceanologia Limnol. Sin.
Oceanologia et Limnologia Sinica. Hai-yang yu hu-chao. Academia Sinica. Peking.

Oceanus.
Oceanus. Woods Hole Oceanographic Institution. Woods Hole, Massachusetts.

Okeanologiia.
Okeanologia. Akademiia Nauk SSSR. Moscow. *See also* Oceanology.

Pacif. Sci.
Pacific Science. Honolulu, Hawaii.

Pesca Mar., Los Ang.
Pesca y Marina. Los Angeles, California, etc.

Philipp. J. Sci.
Philippine Journal of Science. Manila, Quezon City.

Philipp. J. Fish.
Philippine Journal of Fisheries. Department of Agriculture and Natural Resources. Manila.

Priroda.
Priroda. Moscow.

Probl. Ichthyol.
Problems of Ichthyology *afterwards* Journal of Ichthyology. American Fisheries Society. Washington, D.C. *English translation of* Voprosy Ikhtiologii *see* Vop. Ikhtiol. *and* J. Ichthyol.

Proc. Am. Ass. Advmt. Sci.
Proceedings of the American Association for the Advancement of Science. Philadelphia, Pennsylvania.

Proc. Indian Acad. Sci.
Proceedings of the Indian Academy of Sciences. Bangalore, Mysore.

Proc. Indian Sci. Congr.
Proceedings of the Indian Science Congress. Calcutta, etc.

Proc. Indo-Pacif. Fish Coun.
Proceedings: Indo-Pacific Fisheries Council. Bangkok, etc.

Proc. Pan-Pacif. Sci. Congr.
Proceedings of the Pan-Pacific Science Congress. Honolulu, etc.

Proc. Pacif. Sci. Congr.
See Proc. Pan-Pacif. Sci. Congr.

Proc. R. Soc. Qd.
Proceedings of the Royal Society of Queensland. Brisbane, Australia.

Proc. Scient. Fishery Ass.
Proceedings of the Scientific Fishery Association. Suisan gakkai-ho. Tokyo.

Proc. Tech. Pap. Gen. Fish. Coun. Mediterr.
Proceedings and Technical Papers of the General Fisheries Council for the Mediterranean. Food and Agriculture Organization of the United Nations. Rome.

Prog. Rep. Calif. Coop. Ocean. Fish. Invest.
Progress Report. California Cooperative Oceanic Fisheries Investigations. San Francisco.

Prog. Rep. Kagoshima Pref. Fish. Expt. Stn.
Progress Report. Kagoshima Prefectural Fisheries Experimental Station. Kagoshima-ken suisan shikenjo hokoku. Kagoshima City.

Publs. Carnegie Inst.
Publications of the Carnegie Institution of Washington. Washington, D.C.

Rapp. P.-V. Réun. Cons. Perm. Int. Explor. Mer.
Rapport et Procès-Verbaux des Réunions. Conseil Permanent International pour l'Exploration de la Mer. Copenhagen.

Rapp. P.-V. Réun. Commn. Int. Explor. Scient. Mer Méditerr.
Rapport et Procès-Verbaux des Réunions. Commission Internationale pour l'Exploration Scientifique de la Mer Méditerranée. Paris.

Rep. Cent. Fish. Expt. Stn.
Report. Central Fisheries Experimental Station. Suisan shikenjo chosa hokoku. Tokyo.

Rep. Dan. Oceanogr. Exped. Mediterr.
Report of the Danish Oceanographical Expeditions, 1908-10, to the Mediterranean. Copenhagen.

Rep. Fish. Inst.
See J. Tokyo Univ. Fish. — Report. Fisheries Institute. Suisan koshujo shiken hokoku *afterwards* Report of the Imperial Fisheries Institute *no change in Japanese title.* Yokosuka City.

Rep. Imp. Fish. Inst.
See J. Tokyo Univ. Fish. — Report of the Imperial Fisheries Institute. Suisan koshujo shiken hokoku. *Afterwards* Journal of the Imperial Fisheries Institute. Suisan koshujo kenkyu hokoku. Yokosuka City.

Rep. Nankai Reg. Fish. Res. Lab.
Report. Nankai Regional Fisheries Research Laboratory. Nankai-ku suisan kenkyusho hokoku. Kochi City.

Rep. U.S. Bur. Fish.
See Rep. U.S. Commnr. Fish.

Rep. U.S. Commnr. Fish.
Report of the United States Commissioner of Fisheries. Washington, D.C.

Revta. Fac. Cienc. Biol. Univ. Nac. Trujillo.
Revista de la Facultad de Ciencias Biológicas

Universidad Nacional de Trujillo. Trujillo, Perú.

Revue Trav. Inst. Pêch. Marit.
Revue des Travaux. Institut (*formerly* Scientifique et Technique) des Pêches Maritimes. Paris.

Revue Trav. Off. (Scient. Tech.) Pêch. Marit.
See Rev. Trav. Inst. Pêch. Marit.

Ryb. Khoz.
Rybnoe Khoziaistvo. Moscow.

Sci. Bull. Fac. Agric. Kyushu Univ.
Science Bulletin of the Faculty of Agriculture, Kyushu University. Kyushu daigaku nogakubu gakugei zasshi. Fukuoka City.

So. Sea Fish.
South Sea Fisheries. Nanyo suisan. Tokyo.

So. Sea Fish. News.
South Sea Fisheries News. Nanyo suisan joho. Palau, Caroline Islands.

So. Sea Sci.
South Sea Science. Kagaku nanyo. Palau, Caroline Islands.

Spec. Scient. Rep. Fish. U.S. Fish Wildl. Serv.
Special Scientific Report — Fisheries. United States Department of Interior, Fish and Wildlife Service. Washington, D.C.

Study Ser. Jap. Fish. Resor. Conserv. Ass.
Study Series. Japan Fisheries Resource Conservation Association. Nihon suisan shigen hogo hyokai, suisan kenkyu sosho. Tokyo.

Suisan gakkai-ho.
See Proc. Scient. Fishery Ass.

Suisan-gaku zenshu.
See Fish. Sci. Ser.

Suisan kagaku.
See Fish. Sci. Tokyo.

Suisankai.
See J. Fish. Soc. Japan.

Suisan kaiyo kenkyu-kai kai-ho.
See Bull. Jap. Soc. Fish. Oceanogr.

Suisan kenkyu-kai ho.
See J. Fish. Res. Inst. Tokyo.

Suisan kenkyu-shi.
See J. Fish. Res.

Suisan koshujo kenkyu hokoku.
See J. Imp. Fish. Inst.

Suisan koshujo shiken hokoku
See Rep. Fish. Inst. *and* Rep. Imp. Fish. Inst.

Suisan shikenjo chosa hokoku.
See Rep. Cent. Fish. Expt. Stn.

Syst. Zool.
Systematic Zoology. Washington, D.C., etc.

Tech. Pap. Bur. Sport. Fish. Wildl. U.S.
Technical Papers of the Bureau of Sport Fisheries and Wildlife. United States Department of Interior. Washington, D.C.

Tech. Ser. Fla. St. Bd. Conserv.
Technical Series. State of Florida — Board of Conservation. Tallahassee.

Tohoku kaiku suisan kenkyu-sho kenkyu hokoku.
See Bull. Tohoku Reg. Fish. Res. Lab.

Tokai daigaku kiyo kaiyo gakubu.
See J. Coll. Mar. Sci. Technol. Tokai Univ.

Tokaiku suisan kenkyu-sho kenkyu hokoku.
See Bull. Tokai Reg. Fish. Res. Lab.

Tokyo suisan daigaku kenkyu hokoku.
See J. Tokyo Univ. Fish.

Torreia.
Torreia. Habana, Cuba.

Trab. Inst. Esp. Oceanogr.
Trabajos del Instituto Español de Oceanografía. Madrid.

Trans. Am. Fish. Soc.
Transactions of the American Fisheries Society. New York.

Trans. N. Am. Wildl. Conf.
Transactions of the North American Wildlife Conference. Wildlife Management Institute. Washington, D.C.

Trav. Fac. Sci. Rennes, Sér. Océanogr. Biol.
Travaux de la Faculté des Sciences. Série Océanographie Biologique. Université de Rennes. Rennes, France.

Treubia.
Treubia. Recueil de Travaux Zoologiques, Hydrobiologiques, et Océanographiques. (Buitenzorg) Bogor.

Trudy AtlantNIRO.
Trudy. Atlanticheskii Nauchno-Issledovatelskii Institut Rybnogo Khoziaistva i Okeanografii. Kaliningrad, USSR.

Trudy AzcherNIRO.
Trudy Azovsko-Chernomorskogo Nauchno-Issledovatel'skogo Instituta Morskogo Rybnogo Khoziaistva i Okeanografii. Kerch, etc., USSR.

Trudy Inst. Okeanol.
Trudy Instituta Okeanologii. Akademiia Nauk SSSR. Moscow.

Trudy Karadag. Biol. Sta.
Trudy Karadagskoi Biologichicheskoi Stantsii Akademii Nauk Ukrainskoi SSR. Kiev.

Trudy Novorossiisk. Biol. Sta.
Trudy Novorossiiskoi Biologicheskoi Stantsii im. V. M. Arnol'di. Novorossiisk, USSR.

Trudy Sevastopol". Biol. Sta.
Trudy Sevastopol'skoi Biologicheskoi Stantsii. Akademia Nauk SSSR. Sevastopol, USSR.

Trudy VNIRO.
Trudy Vsesoyuznogo Nauchno-Issledovatel'skogo Instituta Morskogo Rybnogo Khoziaistva i Okeanografii. Moscow, etc.

Tuna Fishg.
Tuna Fishing. Investigative Society of Tuna Fishery *afterwards* All Japan Investigative Conference of Tuna. Maguro gyogyo. Maguro gyogyo kenkyu-kai *afterwards* Zenkoku katsuo-maguro kenkyu kyogi-kai. Miura City.

Univ. Calif. SIO Ref.
University of California San Diego. Scripps Institution of Oceanography — Reference. La Jolla, California.

Vie Milieu.
Vie et Milieu. Bulletin du Laboratoire Arago, Université de Paris.

Vop. Ikhtiol.
Voprosy Ikhtiologii. Akademiia Nauk SSSR, Otdelenie Biologicheskikh Nauk. Moscow. *See also* Probl. Ichthyol. *and* J. Ichthyol.

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COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

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Mori, 1967a
Nankai Regional Fisheries Research Laboratory, 1967
Rothschild, 1963
Ueyanagi, 1966a
Watanabe et al., 1966

DISTRIBUTION
Mori, 1967a
Nankai Regional Fisheries Research Laboratory, 1967
Parin, 1968
Watanabe et al., 1966

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No references found

GENERAL BIOLOGY
Nankai Regional Fisheries Research Laboratory, 1967
Watanabe et al., 1966

JUVENILES

DESCRIPTION
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Jones and Kumaran, 1964
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GENERAL BIOLOGY
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DESCRIPTION
Fitch and Roedel, 1963
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Kagoshima Prefectural Fisheries Station, 1926
Kagoshima Prefectural Fisheries Station, 1927
Kazanova, 1962
Kishinouye, 1926
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Nankai Regional Fisheries Research Laboratory, 1967
Richards and Randall, 1967
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Fisheries Agency, Japan, 1966
Fisheries Agency, Japan, 1970b
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Klawe, 1969
Klawe, 1970
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Nellen and Hempel, 1970
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Yokota et al., 1961

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GENERAL BIOLOGY
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Kishinouye, 1924
Klawe and Shimada, 1959
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Schaefer and Marr, 1948b
Ueyanagi and Watanabe, 1962
Wade, 1949
Watanabe, 1962
Watanabe, 1964

DISTRIBUTION
Gorbunova, 1963
Gorbunova, 1965c
Hotta, 1952
Hotta, 1955
Hunter and Mitchell, 1966
Idyll and de Sylva, 1963d
Klawe, 1960b
Klawe, 1963
Klawe and Shimada, 1959
Mead, 1951
Richards and Randall, 1967
Schaefer and Marr, 1948b
Wade, 1949
Watanabe, 1962

COLLECTION METHOD
Fisheries Agency, Japan, 1970a
Hotta, 1952
Inoue et al., 1967
Parona, 1919
Watanabe, 1962
Yabe et al., 1953

GENERAL BIOLOGY
Fisheries Agency, Japan, 1970a
Herald, 1951
Hotta, 1952
Hotta, 1955
Inoue et al., 1967
Inoue et al., 1970
Kishinouye, 1924
Kumaran, 1964b
Marukawa, 1939
Parona, 1919
Yabe et al., 1953

Cybiosarda elegans

EGGS

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

JUVENILES

DESCRIPTION
Jones and Silas, 1960

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

Euthynnus sp.

EGGS

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION

Ueyanagi and Ahlstrom, 1963
Ueyanagi and Watanabe, 1964

DISTRIBUTION
Blackburn, 1965
Klawe, 1969
Parin, 1967a
Yabe et al., 1963

COLLECTION METHOD
No references found

GENERAL BIOLOGY
Blackburn, 1965
Ueyanagi, 1966b

JUVENILES

DESCRIPTION
Nichols and Murphy, 1944

DISTRIBUTION
Nakamura, 1965

COLLECTION METHOD
Nichols and Murphy, 1944

GENERAL BIOLOGY
Nakamura, 1965
Ueyanagi, 1966b

Euthynnus affinis

EGGS

DESCRIPTION
Delsman, 1931
Kamiya, 1924

DISTRIBUTION
Gorbunova, 1965c
Kamiya, 1924

COLLECTION METHOD
No references found

GENERAL BIOLOGY
Anonymous, 1970a
Anonymous, 1970b
Kamiya, 1924

LARVAE

DESCRIPTION
Anonymous, 1970a
Anonymous, 1970b
Delsman, 1931
Gorbunova, 1963
Gorbunova, 1965b
Jones and Kumaran, 1964
Kagoshima Prefectural Fisheries Station, 1926
Kagoshima Prefectural Fisheries Station, 1927
Kikawa et al., 1963b
Kishinouye, 1926
Matsumoto, 1958
Matsumoto, 1959
Matsumoto, 1966b
Wade, 1951
Williams, 1963b
Yabe et al., 1963

DISTRIBUTION
Fursa, 1969
Gorbunova, 1963
Gorbunova, 1965a
Gorbunova, 1965b
Gorbunova, 1965c
Gorbunova, 1966
Jones and Kumaran, 1963
Kikawa et al., 1963b
Matsumoto, 1958

Matsumoto, 1959
Mori et al., 1969
Nakamura and Matsumoto, 1966
Strasburg, 1960
Wade, 1951
Williams, 1963b

COLLECTION METHOD
Mori et al., 1969
Nakamura and Matsumoto, 1966
Strasburg, 1960

GENERAL BIOLOGY
Anonymous, 1970a
Anonymous, 1970b

JUVENILES

DESCRIPTION
Günther, 1889
Jones, 1960b
Jones and Kumaran, 1964
Jones and Silas, 1960
Kishinouye, 1919
Kishinouye, 1923
Kishinouye, 1924
Ueyanagi and Watanabe, 1962
Wade, 1950

DISTRIBUTION
Gorbunova, 1965c
Günther, 1889
Higgins, 1970
Kikawa et al., 1963b
Mori et al., 1969
Ronquillo, 1954
Schaefer, 1948
Wade, 1950

COLLECTION METHOD
Fisheries Agency, Japan, 1970a
Inoue et al., 1967
Mori et al., 1969
Yabe et al., 1953

GENERAL BIOLOGY
Fisheries Agency, Japan, 1970a
Herald, 1951
Higgins, 1970
Inoue et al., 1967
Inoue et al., 1970
Kikawa et al., 1963b
Kishinouye, 1924
Kumaran, 1964b
Yabe et al., 1953

Euthynnus alletteratus

EGGS

DESCRIPTION
Marchal, 1963c
Padoa, 1956

DISTRIBUTION
Gorbunova, 1965c
Marchal, 1963c

COLLECTION METHOD
No references found

GENERAL BIOLOGY
Houde and Richards, 1969
Houde and Richards, 1970

LARVAE

DESCRIPTION
Barthélémy-Lefèvre, 1955
Belloc, 1955
Bini, 1968
Ehrenbaum, 1924
Gorbunova, 1963
Houde and Richards, 1969
Houde and Richards, 1970
Kazanova, 1962
Klawe and Shimada, 1959
Marchal, 1963b
Marchal, 1963c
Matsumoto, 1959
Padoa, 1956
Sanzo, 1909a
Weeks, 1970
Zharov and Zhudova, 1967
Zhudova, 1969a
Zhudova, 1969b

DISTRIBUTION
Barthélémy-Lefèvre, 1955
Belloc, 1955
Conand, 1970
Gorbunova, 1963
Gorbunova, 1965c

Gorbunova, 1966
Gorbunova and Salabarría, 1967
Kazanova, 1962
Klawe, 1960a
Klawe and Shimada, 1959
Marchal, 1963c
Matsumoto, 1959
Richards, 1969b
Richards et al., 1969a
Richards et al., 1969b
Richards et al., 1970
Zharov and Zhudova, 1967
Zhudova, 1969a
Zhudova, 1969b

COLLECTION METHOD
Conand, 1970
Weeks, 1970

GENERAL BIOLOGY
Conand, 1970
Houde and Richards, 1969
Houde and Richards, 1970
Zhudova, 1969a

JUVENILES

DESCRIPTION
Bini, 1968
Demir, M., 1963a
Gorbunova, 1963
Klawe, 1961a
Klawe and Shimada, 1959
Marchal, 1963b
Marchal, 1963c
Matsumoto, 1959
Potthoff and Richards, 1970
Ueyanagi and Watanabe, 1962

DISTRIBUTION
Bullis, 1955
Demir, M., 1961
Demir, M., 1963a
De Sylva and Rathjen, 1961
Dragovich, 1970
Gorbunova, 1963
Gorbunova, 1965c
Klawe, 1961a
Klawe and Shimada, 1959
Marchal, 1963c
Matsumoto, 1959
Potthoff and Richards, 1970
Sund and Richards, 1967

COLLECTION METHOD
Potthoff and Richards, 1970

GENERAL BIOLOGY
Bullis, 1955
Demir, M., 1961
De Sylva and Rathjen, 1961
Dragovich, 1970
Potthoff and Richards, 1970

Euthynnus lineatus

EGGS

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
Calkins and Klawe, 1963
Matsumoto, 1959
Matsumoto, 1966b
Mead, 1951

DISTRIBUTION
Calkins and Klawe, 1963
Klawe, 1963
Klawe et al., 1970
Matsumoto, 1959
Mead, 1951

COLLECTION METHOD
No references found

GENERAL BIOLOGY
Klawe et al., 1970

JUVENILES

DESCRIPTION
Calkins and Klawe, 1963
Clemens, 1956
Matsubara, 1955
Matsumoto, 1959
Mead, 1951
Schaefer and Marr, 1948b
Ueyanagi and Watanabe, 1962

DISTRIBUTION
Calkins and Klawe, 1963
Hunter and Mitchell, 1966
Klawe, 1960b
Klawe, 1963
Matsumoto, 1959
Mead, 1951
Schaefer, 1948
Schaefer, 1958
Schaefer and Marr, 1948b

COLLECTION METHOD
No references found

GENERAL BIOLOGY
Calkins and Klawe, 1963
Clemens, 1956

Grammatorcynus bicarinatus

EGGS

DESCRIPTION
No references found

DISTRIBUTION
Gorbunova, 1965c

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
Jones and Kumaran, 1964
Silas, 1963a
Wade, 1951

DISTRIBUTION
Gorbunova, 1965c
Gorbunova, 1966
Mori et al., 1969
Silas, 1963a
Wade, 1951

COLLECTION METHOD
Mori et al., 1969

GENERAL BIOLOGY
No references found

JUVENILES

DESCRIPTION
Jones and Kumaran, 1964
Silas, 1963a
Wade, 1951

DISTRIBUTION
Gorbunova, 1965c
Mori et al., 1969
Silas, 1963a
Wade, 1951

COLLECTION METHOD
Mori et al., 1969

GENERAL BIOLOGY
No references found

Gymnosarda unicolor

EGGS

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
Gorbunova, 1963

DISTRIBUTION
Gorbunova, 1963

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

JUVENILES

DESCRIPTION
Jones and Silas, 1960

DISTRIBUTION
No references found

COLLECTION METHOD
Fisheries Agency, Japan, 1970a

GENERAL BIOLOGY
Fisheries Agency, Japan, 1970a

Katsuwonidae

EGGS

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
No references found

DISTRIBUTION
Blackburn, 1965
Sette et al., 1954

COLLECTION METHOD
Sette et al., 1954

GENERAL BIOLOGY
Blackburn, 1965
Mito, 1967

JUVENILES

DESCRIPTION
No references found

DISTRIBUTION
Watanabe, 1958

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

Katsuwonus pelamis

EGGS

DESCRIPTION
Kawasaki, 1965
Mito, 1961
Postel, 1963a
Roux, 1961
Waldron, 1963

DISTRIBUTION
Gorbunova, 1965c
Jones and Silas, 1963
Matsuda, 1969

COLLECTION METHOD
No references found

GENERAL BIOLOGY
Kawasaki, 1964
Matsuda, 1969

LARVAE

DESCRIPTION
Barthélémy-Lefèvre, 1955
Belloc, 1955
Bini, 1968
Ehrenbaum, 1924
Gorbunova, 1963
Howell and Juarez, 1954
Ishiyama and Okada, 1957
Jones, 1960a

Jones and Kumaran, 1964
Jones and Silas, 1963
Kagoshima Prefectural Fisheries Station, 1926
Kagoshima Prefectural Fisheries Station, 1927
Kawasaki, 1965
Kazanova, 1962
Kishinouye, 1926
Kubo, 1966
Marchal, 1963b
Matsumoto, 1958
Matsumoto, 1966b
Matsumoto, 1968
Mito, 1967
Nakamura, 1959
Nankai Regional Fisheries Research Laboratory, 1967
Ochiai, 1965
Padoa, 1956
Postel, 1963a
Roux, 1961
Shimada, 1951b
Shirota, 1970
Sun', 1960
Ueyanagi and Watanabe, 1964
Ueyanagi et al., 1969a
Wade, 1951
Waldron, 1963
Yabe, 1953b
Yabe, 1955
Yabe and Ueyanagi, 1962a
Yabe and Ueyanagi, 1962b
Yabe et al., 1963
Zharov and Zhudova, 1967
Zhudova, 1969a
Zhudova, 1969b

DISTRIBUTION

Anonymous, 1970a
Anonymous, 1970b
Barkley, 1969
Barthélémy-Lefèvre, 1955
Belloc, 1955
Blackburn, 1965
Brock, 1959
Bureau of Commercial Fisheries, 1963
Conand, 1970
Far Seas Fisheries Research Laboratory, 1969
Fisheries Agency, Japan, 1964
Fisheries Agency, Japan, 1965
Fisheries Agency, Japan, 1966
Fisheries Agency, Japan, 1970b
Gorbunova, 1963
Gorbunova, 1965a
Gorbunova, 1965c
Gorbunova, 1966
Gorbunova and Salabarría, 1967
Hattori, 1965
Jones, 1960a
Jones and Kumaran, 1963
Jones and Silas, 1963
Joseph and Calkins, 1969
Kawasaki, 1964
Kawasaki, 1965
Kazanova, 1962
Klawe, 1960a
Klawe, 1963
Klawe, 1969
Klawe, 1970
Kubo, 1966
Lim and Lee, 1970
Masuda, 1963
Matsuda, 1969
Matsumoto, 1958
Matsumoto, 1966a
Mori, 1970
Nakamura, 1959
Nakamura and Matsumoto, 1966
Parin, 1968
Postel, 1963a
Richards, 1967
Richards, 1969a
Richards, 1969b
Richards et al., 1969a
Richards et al., 1969b
Richards et al., 1970
Rothschild, 1963
Rothschild, 1965
Schaefer, 1948
Schaefer, 1958
Schaefer, 1959
Schaefer, 1960
Schaefer, 1961
Sette and Rothschild, 1966
Shimada, 1951b
Simmons, 1969
Strasburg, 1960
Sun', 1960
Ueyanagi, 1967a
Ueyanagi, 1967b
Ueyanagi, 1968a
Ueyanagi, 1968b

Ueyanagi, 1969b
Ueyanagi, 1969c
Ueyanagi, 1970
Ueyanagi et al., 1969a
Ueyanagi et al., 1969b
Wade, 1951
Waldron, 1963
Weeks, 1970
Yabe, 1953b
Yabe, 1954
Yabe, 1955
Yabe and Ueyanagi, 1962a
Yabe et al., 1963
Zharov and Zhudova, 1967
Zhudova, 1969a
Zhudova, 1969b

COLLECTION METHOD

Conand, 1970
Fisheries Agency, Japan, 1964
Fisheries Agency, Japan, 1966
Fisheries Agency, Japan, 1970b
Hattori, 1964
Kagoshima Prefectural Fisheries Station, 1926
Kagoshima Prefectural Fisheries Station, 1927
Laurs, 1970
Lim and Lee, 1970
Masuda, 1963
Nakamura, 1959
Nakamura and Matsumoto, 1966
Richards, 1969a
Shimada, 1951b
Strasburg, 1960
Ueyanagi, 1967b
Ueyanagi et al., 1969b
Yabe, 1953b

GENERAL BIOLOGY

Anonymous, 1970a
Anonymous, 1970b
Barkley, 1969
Bini, 1952
Blackburn, 1965
Conand, 1970
Fisheries Agency, Japan, 1964
Joseph and Calkins, 1969
Kagoshima Prefectural Fisheries Station, 1926
Kagoshima Prefectural Fisheries Station, 1927
Kawasaki, 1964
Kawasaki, 1965
Lim and Lee, 1970
Matsuda, 1969
Matsumoto, 1960
Matsumoto, 1966a
Nakamura, 1959
Rothschild, 1963
Rothschild, 1965
Shirota, 1970
Strasburg, 1959
Ueyanagi, 1967b
Ueyanagi, 1968a
Ueyanagi, 1968b
Ueyanagi, 1969b
Ueyanagi, 1969c
Ueyanagi, 1970
Zhudova, 1969a

JUVENILES

DESCRIPTION

Bini, 1968
Eckles, 1949
Gorbunova, 1963
Howell and Juarez, 1954
Jones, 1960a
Jones and Kumaran, 1964
Jones and Silas, 1960
Jones and Silas, 1963
Kagoshima Prefectural Fisheries Station, 1926
Kagoshima Prefectural Fisheries Station, 1927
Kawasaki, 1965
Kishinouye, 1919
Kishinouye, 1922
Kishinouye, 1924
Kishinouye, 1926
Klawe, 1961a
Klawe and Shimada, 1959
Marchal, 1963b
Marr, 1948
Marukawa, 1921
Matsubara, 1955
Matsumoto, 1961
Matsumoto, 1968
Ochiai, 1965
Okamura and Marukawa, 1909
Postel, 1963a
Potthoff and Richards, 1970
Schaefer and Marr, 1948a

Shimada, 1951a
Shimada, 1951b
Suda, 1953
Ueyanagi and Watanabe, 1962
Wade, 1950
Waldron, 1963

DISTRIBUTION
Anonymous, 1941
Ashmole and Ashmole, 1967
Bini, 1952
Bureau of Commercial Fisheries, 1963
Bureau of Commercial Fisheries, 1964
Dragovich, 1970
Eckles, 1949
Fisheries Agency, Japan, 1964
Fujino, 1970
Gorbunova, 1963
Gorbunova, 1965c
Higgins, 1967
Higgins, 1970
Hotta, 1953
Inanami, 1942
Jones and Silas, 1963
Kamimura, 1966
Kawasaki, 1965
Klawe, 1960b
Klawe, 1961a
Klawe, 1963
Klawe and Shimada, 1959
Koga, 1958
Marr, 1948
Matsuda, 1969
Matsumoto, 1961
Nakamura, 1959
Nakamura, 1965
Nakamura and Hiyama, 1957
Nakamura and Matsumoto, 1966
Nakamura Research Staff, 1949
Okamura and Marukawa, 1909
Potthoff and Richards, 1970
Rothschild, 1965
Schaefer, 1948
Schaefer, 1958
Schaefer, 1959
Schaefer, 1960
Schaefer, 1961
Schaefer and Marr, 1948a
Shimada, 1951a
Shimada, 1951b
Simmons, 1969
Suda, 1953
Tominaga, 1957
Ueyanagi, 1965
Ueyanagi, 1967b
Wade, 1950
Waldron, 1963
Yabe and Mori, 1948
Yabe et al., 1963

COLLECTION METHOD
Anonymous, 1941
Bureau of Commercial Fisheries, 1964
Fisheries Agency, Japan, 1964
Fisheries Agency, Japan, 1970a
Hotta, 1953
Hotta and Ogawa, 1955
Inoue et al., 1967
Kamimura, 1966
Koga, 1958
Mori, 1969
Nakamura, 1959
Nomura, 1952
Okamura and Marukawa, 1909
Potthoff and Richards, 1970
Schaefer and Marr, 1948a
Shimada, 1951b
Ueyanagi, 1965
Ueyanagi, 1967b
Yabe et al., 1953
Yabuta, 1953

GENERAL BIOLOGY
Bini, 1952
Dragovich, 1970
Fisheries Agency, Japan, 1964
Fisheries Agency, Japan, 1970a
Herald, 1951
Higgins, 1970
Hotta, 1953
Inoue et al., 1967
Kamimura, 1966
Kishinouye, 1917
Kishinouye, 1924
Marukawa, 1939
Matsuda, 1969
Nakamura, 1965
Okamura and Marukawa, 1909
Potthoff and Richards, 1970
Tominaga, 1957
Ueyanagi, 1967b
Waldron, 1963

Yabe and Mori, 1948
Yabe et al., 1953
Yabuta, 1953

Orcynopsis unicolor

EGGS

DESCRIPTION
No references found

DISTRIBUTION
Gorbunova, 1965c

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
No references found

DISTRIBUTION
Gorbunova, 1965c

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

JUVENILES

DESCRIPTION
Ehrenbaum, 1924
Padoa, 1956
Šoljan, 1948
Šoljan, 1963

DISTRIBUTION
Gorbunova, 1965c

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

Rastrelliger sp.

EGGS

DESCRIPTION
Boonprakob, 1963
Boonprakob, 1965

DISTRIBUTION
Boonprakob, 1963
Boonprakob, 1965
Jones and Rosa, 1967
Panikkar, 1955

COLLECTION METHOD
Boonprakob, 1965

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
Boonprakob, 1965
Matsui, 1963
Matsui, 1970
Peter, 1967
Peter, 1969a

DISTRIBUTION
Boonprakob, 1965
Gorbunova, 1966
Jones and Rosa, 1967
Matsui, 1963
Matsui, 1970
Peter, 1967
Peter, 1969a

COLLECTION METHOD
Boonprakob, 1965
Matsui, 1970
Peter, 1969a

GENERAL BIOLOGY
Matsui, 1970

JUVENILES

DESCRIPTION
Matsui, 1970

DISTRIBUTION
Jones and Rosa, 1967

COLLECTION METHOD
No references found

GENERAL BIOLOGY
Jones and Rosa, 1967
Rao, K. S., 1964

Rastrelliger brachysoma

EGGS

DESCRIPTION
No references found

DISTRIBUTION
Gorbunova, 1965c

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
Gorbunova, 1965b

DISTRIBUTION
Gorbunova, 1965b
Gorbunova, 1965c

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

JUVENILES

DESCRIPTION
No references found

DISTRIBUTION
Gorbunova, 1965c

COLLECTION METHOD
Druzhinin, 1970

GENERAL BIOLOGY
Druzhinin, 1970

Rastrelliger faughni

EGGS

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
No references found
DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

JUVENILES

DESCRIPTION
Manacop, 1956

DISTRIBUTION
Manacop, 1956

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

Rastrelliger kanagurta

EGGS

DESCRIPTION
Balakrishnan, 1957

Delsman, 1926
Delsman, 1931
Devanesan and John, 1940
Jones and Rosa, 1965

DISTRIBUTION
Gorbunova, 1965c

COLLECTION METHOD
Balakrishnan, 1957

GENERAL BIOLOGY
Jones and Rosa, 1965

LARVAE

DESCRIPTION
Delsman, 1926
Delsman, 1931
Gorbunova, 1963
Jones and Kumaran, 1964

DISTRIBUTION
Balakrishnan, 1957
Gorbunova, 1963
Gorbunova, 1965c
Kuthalingam, 1956
Ueyangi et al., 1969b

COLLECTION METHOD
Ueyanagi et al., 1969b

GENERAL BIOLOGY
Balakrishnan, 1957
Jones and Rosa, 1965
Rao and Rao, 1957

JUVENILES

DESCRIPTION
Appannasastry, 1969
Jones and Kumaran, 1964
Manacop, 1956

DISTRIBUTION
Appannasastry, 1969
Balakrishnan, 1957
Basheeruddin and Nayar, 1962
Chacko, 1955
Gorbunova, 1965c
Jones and Rosa, 1965
Kishinouye, 1924
Manacop, 1956
Mori et al., 1969
Rao, K. V., 1964
Rao and Basheeruddin, 1953
Sekharan, 1958

COLLECTION METHOD
Druzhinin, 1970
George and Annigeri, 1960
Mori et al., 1969

GENERAL BIOLOGY
Appannasastry, 1969
Balakrishnan, 1957
Bennet, 1967
Bhimachar and George, 1952
Druzhinin, 1970
George, 1964
George and Annigeri, 1960
George and Banerji, 1968
Manacop, 1956
Pradhan, 1956
Rao, K. V., 1964
Rao, K. V. Narayana, 1964
Rao and Basheeruddin, 1953
Rao and Rao, 1957
Sekharan, 1958

Sarda sp.

EGGS

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
Jones and Kumaran, 1964
Klawe, 1961b
Nankai Regional Fisheries Laboratory, 1967
Ueyanagi and Ahlstrom, 1963
Ueyanagi et al., 1963

DISTRIBUTION
Fisheries Agency, Japan, 1963
Klawe, 1961b
Yabe et al., 1963

COLLECTION METHOD
Fisheries Agency, Japan, 1963

GENERAL BIOLOGY
No references found

JUVENILES

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

Sarda chiliensis

EGGS

DESCRIPTION
Ancieta, 1964
Barnhart, 1927
Orton, 1953a
Orton, 1953b

DISTRIBUTION
Ancieta, 1964
Gorbunova, 1965c

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
Ancieta, 1964
Barnhart, 1927
Orton, 1953a
Orton, 1953b
Pinkas, 1961

DISTRIBUTION
Ancieta, 1964
Gorbunova, 1965c
Pinkas, 1961
Silas, 1964

COLLECTION METHOD
Pinkas, 1961

GENERAL BIOLOGY
No references found

JUVENILES

DESCRIPTION
Ancieta, 1964
Klawe, 1961b
Klawe, 1962
Pinkas, 1961

DISTRIBUTION
Ancieta, 1964
Gorbunova, 1965c
Klawe, 1961b
Klawe, 1962
Pinkas, 1961

COLLECTION METHOD
Klawe, 1961b
Klawe, 1962
Pinkas, 1961

GENERAL BIOLOGY
Bini, 1952

Sarda orientalis

EGGS

DESCRIPTION
Kamiya, 1922
Mito, 1961

DISTRIBUTION
Gorbunova, 1965c

COLLECTION METHOD
No references found

General biology
Kamiya, 1922

LARVAE

Description
Gorbunova, 1963
Mito, 1961

Distribution
Gorbunova, 1963
Gorbunova, 1965c
Silas, 1964

Collection method
Hattori, 1964

General biology
No references found

JUVENILES

Description
Jones, 1961
Jones and Kumaran, 1964
Jones and Silas, 1960
Kikawa et al., 1963a
Kishinouye, 1919
Kishinouye, 1923
Silas, 1963b
Silas, 1964

Distribution
Gorbunova, 1965c
Kikawa et al., 1963a
Silas, 1963b

Collection method
Fisheries Agency, Japan, 1970a
Inoue et al., 1967
Yabe et al., 1953

General biology
Fisheries Agency, Japan, 1970a
Inoue et al., 1967
Inoue et al., 1970
Kumaran, 1964b
Silas, 1964
Yabe et al., 1953

Sarda sarda

EGGS

Description
Altan, 1957a
Bănărescu, 1964
Belloc, 1954
Demir, M., 1957
Demir, M., 1963b
Demir and Demir, 1961
Krotov, 1938
Mel'nichuk, 1941
Oven, 1959
Padoa, 1956
Parona, 1919
Sanzo, 1909a
Sanzo, 1932a
Sette, 1943
Silas, 1964
Vodianitskii, 1936
Vodianitskii and Kazanova, 1954
Zusser, 1954

Distribution
Acara, 1957
Dekhnik and Pavlovskaia, 1950
Demir, M., 1963b
Demir and Demir, 1961
Georgiev et al., 1963
Gorbunova, 1965c
Kosiakina, 1938
Krotov, 1938
Maliatskii, 1940
Mayorova and Tkacheva, 1959
Nikolov, 1960
Vodianitskii, 1939
Zusser, 1954

Collection method
No references found

General biology
Acara, 1957
Demir, M., 1957
Demir and Demir, 1961
Mayorova and Tkacheva, 1959
Mayorova and Tkacheva, 1960
Oven, 1959
Parona, 1919
Sanzo, 1909a

Silas, 1964
Vinohradov, 1948

LARVAE

DESCRIPTION
Altan, 1957a
Bănărescu, 1964
Belloc, 1954
Bini, 1968
Demir, M., 1963b
Ehrenbaum, 1924
Mel'nichuk, 1941
Padoa, 1956
Parona, 1919
Sanzo, 1909a
Sanzo, 1932a
Vodianitskii, 1936
Vodianitskii and Kazanova, 1954
Zusser, 1954

DISTRIBUTION
Dekhnik et al., 1966
Demir, M., 1963b
Devedjian, 1926
Georgiev et al., 1963
Gorbunova, 1965c
Gorbunova, 1966
Gorbunova and Salabarría, 1967
Mayorova and Tkacheva, 1959
Nikolov, 1960
Vodianitskii, 1939

COLLECTION METHOD
No references found

GENERAL BIOLOGY
Parona, 1919
Sanzo, 1909a
Vinohradov, 1948

JUVENILES

DESCRIPTION
Bănărescu, 1964
Belloc, 1954
Bini, 1968
De Buen, 1930
De Buen, 1932
Demir, M., 1963b
Idyll and de Sylva, 1963a
Klawe, 1961a
Klawe and Shimada, 1959
Meyer, 1956
Padoa, 1956
Šoljan, 1948
Šoljan, 1963

DISTRIBUTION
Borcea, 1929
Borcea, 1933
De Buen, 1930
De Buen, 1932
Demir, M., 1957
Demir, M., 1963b
Devedjian, 1926
Furnestin et al., 1958
Gorbunova, 1965c
Idyll and de Sylva, 1963a
Klawe, 1961a
Klawe and Shimada, 1959
Krotov, 1938
Mayorova and Tkacheva, 1959
Nikolov, 1960
Nümann, 1953
Nümann, 1955
Serbétis, 1955
Zusser, 1954

COLLECTION METHOD
No references found

GENERAL BIOLOGY
Krotov, 1938
Meyer, 1956
Nümann, 1955
Parona, 1919
Porumb and Porumb, 1959

Scomber sp.

EGGS

DESCRIPTION
No references found

DISTRIBUTION
Matuda, 1966

COLLECTION METHOD
Matuda, 1966

GENERAL BIOLOGY
Matuda, 1966

LARVAE

DESCRIPTION
Ueyanagi et al., 1963

DISTRIBUTION
Hattori, 1964
Klawe, 1969
Matuda, 1966
Yokota et al., 1961

COLLECTION METHOD
Hattori, 1964
Matuda, 1966

GENERAL BIOLOGY
Hattori, 1964
Matuda, 1966
Yokota et al., 1961

JUVENILES

DESCRIPTION
No references found

DISTRIBUTION
Dragovich, 1970
Hattori, 1964

COLLECTION METHOD
Hattori, 1964
Hotta and Ogawa, 1955

GENERAL BIOLOGY
Dragovich, 1970
Hattori, 1964
Iizuka and Kotaki, 1969

Scomber australasicus

EGGS

DESCRIPTION
Anonymous, 1966
Mito, 1960
Mito, 1961

DISTRIBUTION
Anonymous, 1961
Anonymous, 1962a
Anonymous, 1962b
Anonymous, 1965
Anonymous, 1966
Anonymous, 1969
Matsuda, 1969
Uchida and Dotsu, 1958

COLLECTION METHOD
Anonymous, 1961
Anonymous, 1962a
Uchida and Dotsu, 1958

GENERAL BIOLOGY
Anonymous, 1961
Anonymous, 1962a
Anonymous, 1962b
Anonymous, 1965
Anonymous, 1966
Anonymous, 1969
Matsuda, 1969
Mito, 1960
Uchida and Dotsu, 1958

LARVAE

DESCRIPTION
Mito, 1961
Shimomura and Fukataki, 1957
Yabe, 1953a

DISTRIBUTION
Anonymous, 1961
Anonymous, 1962a
Anonymous, 1962b
Anonymous, 1965
Anonymous, 1966
Anonymous, 1969
Matsuda, 1969
Nomura, 1959
Shimomura and Fukataki, 1957
Tanoue, 1956
Tanoue, 1961
Tanoue and Tamari, 1960
Uchida and Dotsu, 1958
Yokota et al., 1961

COLLECTION METHOD
Anonymous, 1961
Anonymous, 1962a
Anonymous, 1966
Nomura, 1959
Shimomura and Fukataki, 1957
Tanoue, 1961

Tanoue and Tamari, 1960
Uchida and Dotsu, 1958

General biology
Anonymous, 1961
Anonymous, 1962a
Anonymous, 1962b
Anonymous, 1965
Anonymous, 1969
Matsuda, 1969
Shimomura and Fukataki, 1957
Tanoue, 1956
Tanoue, 1961
Tanoue and Tamari, 1960
Uchida and Dotsu, 1958
Yokota et al., 1961

JUVENILES

Description
Manacop, 1956
Shimomura and Fukataki, 1957

Distribution
Abe et al., 1968
Anonymous, 1962b
Anonymous, 1969
Matsuda, 1969
Shimomura and Fukataki, 1957
Tanoue, 1956
Tanoue, 1961
Uchida and Dotsu, 1958

Collection method
Shimomura and Fukataki, 1957
Tanoue, 1961
Uchida and Dotsu, 1958

General biology
Anonymous, 1962b
Anonymous, 1969
Matsuda, 1969
Shimomura and Fukataki, 1957
Tanoue, 1956
Tanoue, 1961
Uchida and Dotsu, 1958

Scomber japonicus

EGGS

Description
Ahlstrom, 1956
Dekhnik, 1959
Demir, N., 1961
Fry, 1936a
Il'ina, 1951
Jones and Kumaran, 1964
Kamiya, 1916
Kamiya, 1924
Kamiya, 1925
Kramer, 1960
Kramer, 1969
Mito, 1960
Mito, 1961
Motoda, 1955a
Motoda, 1955b
Ochiai, 1965
Uchida et al., 1958
Watanabe, 1970

Distribution
Dekhnik, 1959
Demir, N., 1961
Devedjian, 1926
Fry, 1936b
Gorbunova, 1965c
Hattori, 1965
Il'ina, 1951
Kamiya, 1916
Kamiya, 1924
Kamiya, 1925
Kawasaki, 1968
Kramer, 1960
Kramer, 1969
Matsuda, 1969
Motoda, 1955a
Motoda, 1955b
Motoda and Anraku, 1955
Ochiai, 1965
Odate, 1961
Okiyama, 1965
Roedel, 1949
Sano and Tamura, 1958
Watanabe, 1970
Zviagina, 1961

Collection method
Dekhnik, 1959

Fukataki, 1956
Kamiya, 1916
Kamiya, 1925
Kawasaki, 1968
Kramer, 1960
Motoda, 1955a
Motoda, 1955b
Motoda and Anraku, 1955
Odate, 1961
Okiyama, 1965
Sano and Tamura, 1958
Zviagina, 1961

General biology
Dekhnik, 1959
Fukataki, 1956
Hattori, 1965
Il'ina, 1951
Kamiya, 1916
Kamiya, 1924
Kamiya, 1925
Kawasaki, 1968
Kramer, 1960
Matsuda, 1969
Mito, 1960
Motoda, 1955a
Motoda, 1955b
Motoda and Anraku, 1955
Ochiai, 1965
Odate, 1961
Okiyama, 1965
Sano and Tamura, 1958
Watanabe, 1970
Zviagina, 1961

LARVAE

Description
Ahlstrom, 1956
Bini, 1968
Dekhnik, 1959
Demir, N., 1961
Ehrenbaum, 1924
Fry, 1936a
Jones and Kumaran, 1964
Kamiya, 1916
Kamiya, 1925
Kramer, 1960
Kramer, 1969
Mito, 1961
Mito, 1966
Nomura, 1959
Ochiai, 1965
Padoa, 1956
Roedel, 1949
Shirota, 1970
Uchida et al., 1958
Watanabe, 1970

Distribution
Ahlstrom, 1953
Ahlstrom, 1954
Ahlstrom, 1956
Ahlstrom, 1958
Ahlstrom, 1959
Ahlstrom and Kramer, 1955
Ahlstrom and Kramer, 1956
Ahlstrom and Kramer, 1957
Conand, 1970
Dekhnik, 1959
Demir, N., 1961
Fry, 1936b
Fukataki, 1956
Gorbunova, 1965c
Hattori, 1965
Hattori, 1970
Hayano, 1954
Il'ina, 1951
Kawasaki, 1968
Kobayashi, 1960
Kobayashi and Abe, 1962
Kramer, 1960
Kramer, 1969
Kramer and Smith, 1970
Matsuda, 1969
Nomura, 1959
Ochiai, 1965
Odate, 1961
Okiyama, 1965
Roedel, 1949
Uchida, 1954
Watanabe, 1970

Collection method
Conand, 1970
Dekhnik, 1959
Fukataki, 1956
Hattori, 1970
Kawasaki, 1968
Kramer, 1960
Nomura, 1959
Odate, 1961
Okiyama, 1965

General biology
Ahlstrom, 1959
Dekhnik, 1959
Fukataki, 1956
Hattori, 1965
Hattori, 1970
Hayano, 1954
Il'ina, 1951
Kamiya, 1916
Kamiya, 1925
Kawasaki, 1968
Kobayashi, 1960
Kramer, 1960
Kramer, 1969
Kramer and Smith, 1970
Matsuda, 1969
Mito, 1967
Nellen and Hempel, 1970
Ochiai, 1965
Odate, 1961
Okiyama, 1965
Sano and Tamura, 1958
Shirota, 1970
Uchida, 1954
Watanabe, 1970

JUVENILES

Description
Bini, 1968
Jones and Kumaran, 1964
Kishinouye, 1923
Kramer, 1960
Kramer, 1969
Ochiai, 1965
Roedel, 1949
Šoljan, 1948
Šoljan, 1963
Uchida et al., 1958
Watanabe, 1970

Distribution
Dragovich, 1970
Gorbunova, 1965c
Hattori, 1965
Kawasaki, 1968
Kobayashi, 1960
Kramer, 1960
Kramer, 1969
Matsuda, 1969
Ochiai, 1965
Odate, 1961
Uchida, 1954
Watanabe, 1970

Collection method
Kramer, 1960
Odate, 1961
Van Olst and Hunter, 1970

General biology
Dragovich, 1970
Hattori, 1965
Kobayashi, 1960
Kramer, 1960
Kramer, 1969
Matsuda, 1969
Mitchell and Hunter, 1970
Ochiai, 1965
Odate, 1961
Van Olst and Hunter, 1970
Watanabe, 1970

Scomber scombrus

EGGS

Description
Bănărescu, 1964
Bigelow and Schroeder, 1953
Bigelow and Welsh, 1925
Borcea, 1929
Borcea, 1933
Dekhnik, 1959
Demir and Arim, 1957
Ehrenbaum, 1909
Hildebrand and Schroeder, 1928
Kamiya, 1916
Le Gall, 1938
Lissner, 1938
Padoa, 1956
Sella and Ciacchi, 1925
Sette, 1943
Sparks, 1929
Tracy, 1907
Vodianitskii, 1936
Vodianitskii and Kazanova, 1954

Distribution
Bănărescu, 1964
Bigelow and Schroeder, 1953
Bigelow and Welsh, 1925
Corbin, 1947

Demir and Arim, 1957
Devedjian, 1926
Gorbunova, 1965c
Hildebrand and Schroeder, 1928
Kändler, 1952
Kändler, 1954
Sette, 1943
Sparks, 1929
Steven, 1949

COLLECTION METHOD
Corbin, 1947
Sette, 1943
Sparks, 1929

GENERAL BIOLOGY
Borcea, 1929
Corbin, 1947
Kändler, 1952
Kändler, 1954
Sette, 1943
Tracy, 1907

LARVAE

DESCRIPTION
Bănărescu, 1964
Bigelow and Schroeder, 1953
Bigelow and Welsh, 1925
Bini, 1968
Cunningham, 1891a
Cunningham, 1891b
Dekhnik, 1959
Ehrenbaum, 1909
Ehrenbaum, 1923
Ehrenbaum, 1924
Le Gall, 1938
Lissner, 1938
Padoa, 1956
Sella and Ciacchi, 1925
Sette, 1943
Vodianitskii and Kazanova, 1954

DISTRIBUTION
Bigelow and Schroeder, 1953
Bigelow and Welsh, 1925
Clark et al., 1969
Corbin, 1947
Demir and Arim, 1957
Ehrenbaum, 1923
Gorbunova, 1965c
Gorbunova, 1966
Karlovac, 1961
Karlovac, 1962
Müller, 1970
Sette, 1943
Steven, 1949

COLLECTION METHOD
Corbin, 1947
Müller, 1970
Nellen and Hempel, 1970
Sette, 1943

GENERAL BIOLOGY
Corbin, 1947
Demir and Arim, 1957
Kändler, 1961
Karlovac, 1961
Karlovac, 1962
Lebour, 1918
Marr, 1956
Müller, 1970
Nellen and Hempel, 1970
Sette, 1943

JUVENILES

DESCRIPTION
Bănărescu, 1964
Bigelow and Schroeder, 1953
Bigelow and Welsh, 1925
Bini, 1968
Ehrenbaum, 1909
Ehrenbaum, 1923
Le Gall, 1938
Padoa, 1956
Sette, 1943

DISTRIBUTION
Bigelow and Schroeder, 1953
Bigelow and Welsh, 1925
Demir and Arim, 1957
Dragovich, 1970
Ehrenbaum, 1923
Gorbunova, 1965c
Karlovac, 1961
Karlovac, 1962
Nellen and Hempel, 1970
Parsons and Hodder, 1970
Serbétis, 1955
Sette, 1943
Steven, 1948

COLLECTION METHOD
Nellen and Hempel, 1970
Sette, 1943

GENERAL BIOLOGY
Demir and Arim, 1957
Dragovich, 1970
Karlovac, 1961
Karlovac, 1962
Lebour, 1918
Nellen and Hempel, 1970
Sette, 1943
Steven, 1948
Steven, 1949
Steven, 1952

Scomberomorus sp.

EGGS

DESCRIPTION
No references found

DESCRIPTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
Peter, 1969b

LARVAE

DESCRIPTION
Gorbunova, 1963

DISTRIBUTION
Gorbunova, 1963
Gorbunova, 1966
Gorbunova and Salabarría, 1967

COLLECTION METHOD
Hattori, 1964

GENERAL BIOLOGY
Peter, 1969b

JUVENILES

DISTRIBUTION
Ehrenbaum, 1924
Klawe, 1961a.

DISTRIBUTION
Klawe, 1961a

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

Scomberomorus cavalla

EGGS

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
Wollam, 1970

DISTRIBUTION
Wollam, 1970

COLLECTION METHOD
Wollam, 1970

GENERAL BIOLOGY
Wollam, 1970

JUVENILES

DESCRIPTION
Wollam, 1970

DISTRIBUTION
Wollam, 1970

COLLECTION METHOD
Wollam, 1970

General biology
Wollam, 1970

Scomberomorus chinense

EGGS

Description
No references found

Distribution
No references found

Collection method
No references found

General biology
No references found

LARVAE

Description
No references found

Distribution
No references found

Collection method
No references found

General biology
No references found

JUVENILES

Description
Kishinouye, 1924

Distribution
No references found

Collection method
No references found

General biology
No references found

Scomberomorus commerson

EGGS

Description
Chacko, 1950
Jones and Kumaran, 1964
Mito, 1960
Mito, 1961
Munro, 1943a

Distribution
Chacko, 1950
Gorbunova, 1965c

Collection method
Chacko, 1950

General biology
No references found

LARVAE

Description
Chacko, 1950
Gorbunova, 1965b
Jones, 1962
Jones and Kumaran, 1964
Mito, 1961
Munro, 1943a

Distribution
Chacko, 1950
Gorbunova, 1965b
Gorbunova, 1965c

Collection method
Chacko, 1950

General biology
No references found

JUVENILES

Description
Jones, 1962
Jones and Kumaran, 1964
Kishinouye, 1923
Smith, 1949
Williams, 1964

DISTRIBUTION
Basheeruddin and Nayar, 1962
Gorbunova, 1965c

COLLECTION METHOD
No references found

GENERAL BIOLOGY
Kumaran, 1964a
Rao, K. S., 1964
Tongyai, 1970

Scomberomorus concolor

EGGS

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

JUVENILES

DESCRIPTION
Fitch and Flechsig, 1949
Klawe, 1966

DISTRIBUTION
Fitch and Flechsig, 1949
Klawe, 1966

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

Scomberomorus guttatus

EGGS

DESCRIPTION
Delsman, 1931
Mito, 1960
Mito, 1961
Vijayaraghavan, 1955

DISTRIBUTION
Gorbunova, 1965c

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
Delsman, 1931
Delsman and Hardenburg, 1934
Gorbunova, 1965b
Jones, 1962
Jones and Kumaran, 1964
Mito, 1961
Vijayaraghavan, 1955

DISTRIBUTION
Gorbunova, 1965b
Gorbunova, 1965c

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

JUVENILES

DESCRIPTION
Herre and Myers, 1937
Jones, 1962
Jones and Kumaran, 1964

Kaikini, 1960
Kishinouye, 1923
Vijayaraghavan, 1955

DISTRIBUTION
Basheeruddin and Nayar, 1962
Gorbunova, 1965c
Herre and Myers, 1937
Kaikini, 1960
Merçeron, 1970

COLLECTION METHOD
Merçeron, 1970

GENERAL BIOLOGY
Kumaran, 1964a
Merçeron, 1964
Rao, K. S., 1964
Venkataraman, 1960
Vijayaraghavan, 1955

Scomberomorus lineolatus

EGGS

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
Jones, 1962

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

JUVENILES

DESCRIPTION
No references found

DISTRIBUTION
Merçeron, 1970

COLLECTION METHOD
Merçeron, 1970

GENERAL BIOLOGY
Kuthalingam, 1959
Merçeron, 1970
Rao, K. S., 1964

Scomberomorus maculatus

EGGS

DESCRIPTION
Earll, 1884
Hildebrand and Schroeder, 1928
Ryder, 1882
Smith, 1907
Tracy, 1907

DISTRIBUTION
Gorbunova, 1965c
Hildebrand and Schroeder, 1928
Smith, 1907
Tracy, 1907

COLLECTION METHOD
No references found

GENERAL BIOLOGY
Earll, 1882
Earll, 1884
Kite, 1885
Klima, 1959
Ryder, 1882
Smiley, 1881
Smith, 1907
Tracy, 1907
Verrill, 1880
Wood, 1885

LARVAE

DESCRIPTION
Hildebrand and Cable, 1938

Ryder, 1882
Wollam, 1970

DISTRIBUTION
Gorbunova, 1965c
Wollam, 1970

COLLECTION METHOD
Wollam, 1970

GENERAL BIOLOGY
Earll, 1882
Earll, 1884
Ryder, 1882
Smiley, 1881
Verrill, 1880
Wollam, 1970

JUVENILES

DESCRIPTION
Hildebrand and Cable, 1938
Wollam, 1970

DISTRIBUTION
Gorbunova, 1965c
Wollam, 1970

COLLECTION METHOD
Wollam, 1970

GENERAL BIOLOGY
Wollam, 1970

Scomberomorus niphonius

EGGS

DESCRIPTION
Kamiya, 1922
Kamiya, 1924
Mito, 1960
Mito, 1961
Mito, 1966
Sha et al., 1966

DISTRIBUTION
Gorbunova, 1965c
Kamiya, 1922
Kamiya, 1924

COLLECTION METHOD
Sha et al., 1966

GENERAL BIOLOGY
Kamiya, 1924
Mito, 1960
Sha et al., 1966

LARVAE

DESCRIPTION
Mito, 1961
Mito, 1966
Sha et al., 1966

DISTRIBUTION
Gorbunova, 1965c

COLLECTION METHOD
No references found

GENERAL BIOLOGY
Mito, 1967
Sha et al., 1966

JUVENILES

DESCRIPTION
Kishinouye, 1923
Sha et al., 1966

DISTRIBUTION
Gorbunova, 1965c

COLLECTION METHOD
No references found

GENERAL BIOLOGY
Sha et al., 1966

Scomberomorus queenslandicus

EGGS

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

General biology
No references found

LARVAE

Description
No references found

Distribution
No references found

Collection method
No references found

General biology
No references found

JUVENILES

Description
Jones and Silas, 1964
Munro, 1943b

Distribution
No references found

Collection method
No references found

General biology
No references found

Scomberomorus regalis

EGGS

Description
No references found

Distribution
No references found

Collection method
No references found

General biology
No references found

LARVAE

Description
No references found

Distribution
No references found

Collection method
No references found

General biology
No references found

JUVENILES

Description
Hubbs, 1936

Distribution
Hubbs, 1936

Collection method
No references found

General biology
No references found

Scomberomorus semifasciatus

EGGS

Description
No references found

Distribution
No references found

Collection method
No references found

General biology
No references found

LARVAE

Description
No references found

Distribution
No references found

Collection method
No references found

General biology
No references found

JUVENILES

DESCRIPTION
Jones and Silas, 1964
Munro, 1943b

DISTRIBUTION
Munro, 1943b

COLLECTION METHOD
No references found

GENERAL BIOLOGY
Munro, 1943b

Scomberomorus sierra

EGGS

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
Klawe, 1966
Matsumoto, 1968

DISTRIBUTION
Klawe, 1966

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

JUVENILES

DESCRIPTION
Clemens, 1956
Eckles, 1949
Fitch and Flechsig, 1949
Klawe, 1966
Matsubara, 1955
Matsumoto, 1968
Mead, 1951

DISTRIBUTION
Eckles, 1949
Fitch and Flechsig, 1949
Klawe, 1966
Mead, 1951

COLLECTION METHOD
No references found

GENERAL BIOLOGY
Clemens, 1956
Herald, 1951

Scomberomorus sinensis

EGGS

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

JUVENILES

DESCRIPTION
Blanc et al., 1965

D'Aubenton and Blanc, 1965

DISTRIBUTION
D'Aubenton and Blanc, 1965

COLLECTION METHOD
No references found

GENERAL BIOLOGY
D'Aubenton and Blanc, 1965

Scomberomorus tritor

EGGS

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
Zharov and Zhudova, 1967
Zhudova, 1969a

DISTRIBUTION
Conand, 1970
Zharov and Zhudova, 1967
Zhudova, 1969a

COLLECTION METHOD
Conand, 1970

GENERAL BIOLOGY
Conand, 1970
Zhudova, 1969a

JUVENILES

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

Scombridae

EGGS

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
Matsumoto et al., 1966
Matsumoto et al., 1969
Ueyanagi and Ahlstrom, 1963

GENERAL BIOLOGY
Kunitsyn, 1968
Matsumoto et al., 1969
Peter, 1969b

LARVAE

DESCRIPTION
Matsumoto et al., 1969

DISTRIBUTION
Clark et al., 1969
Fisheries Agency, Japan, 1964

COLLECTION METHOD
Fisheries Agency, Japan, 1963
Fisheries Agency, Japan, 1964
Fisheries Agency, Japan, 1968
Fisheries Agency, Japan, 1969
Matsumoto et al., 1966
Matsumoto et al., 1969
Ueyanagi and Ahlstrom, 1963
Ueyanagi et al., 1963

GENERAL BIOLOGY
Fisheries Agency, Japan, 1966
Kunitsyn, 1968
Matsumoto et al., 1969
Peter, 1969b

JUVENILES

DESCRIPTION
No references found

DISTRIBUTION
Ashmole and Ashmole, 1967
Ashmole and Ashmole, 1968
Basheeruddin and Nayar, 1962
Dragovich, 1970
Weeks, 1970

COLLECTION METHOD
Matsumoto et al., 1966
Matsumoto et al., 1969

GENERAL BIOLOGY
Dragovich, 1970

Thunnidae

EGGS

DESCRIPTION
Nakamura, 1959

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
Peter, 1969b

LARVAE

DESCRIPTION
Aboussouan, 1969
Wickstead, 1965

DISTRIBUTION
Aboussouan, 1965
Aboussouan, 1969
Blackburn, 1965
Dekhnik et al., 1966
Fisheries Agency, Japan, 1963
Fursa, 1969
Sette et al., 1954
Ueyanagi, 1967b
Wade, 1951

COLLECTION METHOD
Aboussouan, 1965
Fisheries Agency, Japan, 1963
Nellen and Hempel, 1970
Sette et al., 1954
Ueyanagi, 1965
Ueyanagi, 1967b

GENERAL BIOLOGY
Aboussouan, 1965
Blackburn, 1965
Mito, 1967
Nakamura, 1959
Peter, 1969b
Ueyanagi, 1966b
Ueyanagi, 1967b

JUVENILES

DESCRIPTION
No references found

DISTRIBUTION
Scaccini, 1959
Scaccini, 1967a
Ueyanagi, 1967b
Watanabe, 1958

COLLECTION METHOD
Mori, 1969
Ueyanagi, 1967b
Yabuta, 1953

GENERAL BIOLOGY
Scaccini, 1959
Scaccini, 1961a
Ueyanagi, 1966b
Ueyanagi, 1967b
Yabuta, 1953

Thunnus sp.

EGGS

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

General biology
No references found

LARVAE

Description
Gorbunova, 1963
Klawe, 1961a
Klawe and Shimada, 1959
Sun', 1960
Ueyanagi and Ahlstrom, 1963
Yabe and Ueyanagi, 1962a
Yabe and Ueyanagi, 1962b
Zhudova, 1969b

Distribution
Barthélémy-Lefèvre, 1955
Gorbunova, 1963
Jones and Kumaran, 1963
Klawe, 1960a
Klawe, 1961a
Klawe and Shimada, 1959
Mori, 1970
Sun', 1960
Yabe and Ueyanagi, 1962a
Yabe and Ueyanagi, 1962b
Zhudova, 1969b

Collection method
No references found

General biology
No references found

JUVENILES

Description
Fowler, 1944
Kagoshima Prefectural Fisheries Station, 1926
Kagoshima Prefectural Fisheries Station, 1927
Kishinouye, 1926
Klawe, 1961a
Klawe and Shimada, 1959

Distribution
Dragovich, 1970
Fowler, 1944
Klawe, 1961a
Klawe and Shimada, 1959
Parin, 1967b

Collection method
No references found

General biology
Dragovich, 1970

Thunnus alalunga

EGGS

Description
Belloc, 1954
Le Gall, 1949
Padoa, 1956
Parona, 1919
Sanzo, 1909a
Sanzo, 1925
Sanzo, 1933
Yoshida and Otsu, 1963

Distribution
Gorbunova, 1965c
Postel, 1963b

Collection method
No references found

General biology
Sanzo, 1909a

LARVAE

Description
Belloc, 1954
Bini, 1968
Ehrenbaum, 1924
Gorbunova, 1963
Jones and Kumaran, 1964
Kazanova, 1962
Le Gall, 1949
Lütken, 1880
Lütken, 1881
Matsumoto, 1962
Matsumoto, 1966b
Nankai Regional Fisheries Research Laboratory, 1967
Padoa, 1956
Sanzo, 1909a
Sanzo, 1925
Sanzo, 1933
Scaccini, 1967b
Scaccini, 1968

Sella, 1924
Ueyanagi, 1966a
Ueyanagi, 1969b
Ueyanagi and Watanabe, 1964
Ueyanagi et al., 1963
Ueyanagi et al., 1969a
Yabe et al., 1963
Yoshida and Otsu, 1963
Zharov and Zhudova, 1967
Zhudova, 1969a

DISTRIBUTION
Far Seas Fisheries Research Laboratory, 1969
Fisheries Agency, Japan, 1964
Fisheries Agency, Japan, 1966
Fisheries Agency, Japan, 1970b
Gorbunova, 1963
Gorbunova, 1965a
Gorbunova, 1965c
Gorbunova, 1966
Gorbunova and Salabarría, 1967
Hayasi et al., 1970
Kazanova, 1962
Le Danois, 1951
Lütken, 1880
Matsumoto, 1962
Matsumoto, 1966a
Nakamura and Matsumoto, 1966
Parin, 1968
Postel, 1963b
Richards, 1967
Richards, 1969a
Schaefer, 1948
Ueyanagi, 1967a
Ueyanagi, 1967b
Ueyanagi, 1968b
Ueyanagi, 1969b
Ueyanagi, 1969c
Ueyanagi et al., 1969a
Yoshida and Otsu, 1963
Zharov and Zhudova, 1967
Zhudova, 1969a

COLLECTION METHOD
Fisheries Agency, Japan, 1964
Fisheries Agency, Japan, 1966
Fisheries Agency, Japan, 1970b
Nakamura and Matsumoto, 1966
Richards, 1969a
Sella, 1924
Ueyanagi, 1967b

GENERAL BIOLOGY
Fisheries Agency, Japan, 1964
Hayasi et al., 1970
Matsumoto, 1966a
Sanzo, 1909a
Ueyanagi, 1967b
Ueyanagi, 1968b
Ueyanagi, 1969c
Zhudova, 1969a

JUVENILES

DESCRIPTION
Asano, 1964
Jones and Silas, 1960
Kishinouye, 1923
Lütken, 1881
Matsumoto, 1963
Padoa, 1956
Postel, 1962
Postel, 1964
Sella, 1924
Ueyanagi and Watanabe, 1962
Watson and Mather, 1961
Yabe et al., 1958
Yoshida, 1965

DISTRIBUTION
Asano, 1964
Ashmole and Ashmole, 1967
Demir, M., 1961
Fisheries Agency, Japan, 1966
Gorbunova, 1965c
Hayasi et al., 1970
Higgins, 1967
Higgins, 1970
Le Danois, 1951
Nakamura, 1959
Postel, 1963b
Schaefer, 1948
Ueyanagi, 1967b
Ueyanagi and Watanabe, 1962
Yabe et al., 1958
Yabe et al., 1963
Yoshida, 1965
Yoshida, 1968

COLLECTION METHOD
Fisheries Agency, Japan, 1966
Nakamura, 1959
Sella, 1924
Ueyanagi, 1967b

Yabe et al., 1958

General biology
Asano, 1964
Demir, M., 1961
Hayasi et al., 1970
Higgins, 1970
Kishinouye, 1917
Ueyanagi, 1967b
Yoshida, 1968
Yoshida and Otsu, 1963

Thunnus albacares

EGGS

Description
Anonymous, 1970a
Anonymous, 1970b
Fisheries Agency, Japan, 1970a

Distribution
Gorbunova, 1965c

Collection method
Anonymous, 1970a
Anonymous, 1970b

General biology
Fisheries Agency, Japan, 1970a

LARVAE

Description
Anonymous, 1970a
Anonymous, 1970b
Bellón, 1954b
Fisheries Agency, Japan, 1970a
Gorbunova, 1963
Jones, 1960a
Jones and Kumaran, 1964
Kazanova, 1962
Marchal, 1963a
Marchal, 1963b
Matsubara, 1955
Matsumoto, 1958
Matsumoto, 1966b
Mead, 1951
Mimura et al., 1963a
Nakamura, 1959
Nankai Regional Fisheries Laboratory, 1967
Ochiai, 1965
Schaefer et al., 1963
Shirota, 1970
Sun', 1960
Ueyanagi, 1966a
Ueyanagi, 1969b
Ueyanagi and Watanabe, 1964
Ueyanagi et al., 1969a
Wade, 1950
Wade, 1951
Yabe and Ueyanagi, 1962a
Yabe and Ueyanagi, 1962b
Yabe et al., 1963
Zharov and Zhudova, 1967
Zhudova, 1969a
Zhudova, 1969b

Distribution
Anonymous, 1970a
Anonymous, 1970b
Bellón, 1954b
Blackburn, 1965
Brock, 1959
Conand, 1970
Far Seas Fisheries Research Labo
tory, 1969
Fisheries Agency, Japan, 1964
Fisheries Agency, Japan, 1966
Fisheries Agency, Japan, 1970b
Fursa, 1969
Gorbunova, 1963
Gorbunova, 1965a
Gorbunova, 1965c
Gorbunova, 1966
Gorbunova and Salabarría, 1967
Hayasi et al., 1970
Hattori, 1965
Jones, 1960a
Jones and Kumaran, 1963
Kazanova, 1962
Klawe, 1958
Klawe, 1961c
Klawe, 1963
Klawe, 1969
Klawe et al., 1970
Marchal, 1963a
Matsumoto, 1958
Matsumoto, 1966a
Mead, 1951
Mimura et al., 1963a
Mori, 1970
Murphy and Pella, 1966

Nakamura, 1959
Nakamura and Matsumoto, 1966
Ochiai, 1965
Parin, 1968
Richards, 1967
Richards, 1969a
Richards, 1969b
Richards et al., 1969a
Richards et al., 1969b
Richards et al., 1970
Rothschild, 1963
Schaefer, 1948
Schaefer, 1958
Schaefer, 1959
Schaefer, 1960
Schaefer et al., 1963
Sette et al., 1954
Strasburg, 1960
Sun', 1960
Ueyanagi, 1966b
Ueyanagi, 1967a
Ueyanagi, 1967b
Ueyanagi, 1968b
Ueyanagi, 1969b
Ueyanagi, 1969c
Ueyanagi et al., 1969a
Ueyanagi et al., 1969b
Wade, 1950
Wade, 1951
Yabe and Ueyanagi, 1962a
Yabe and Ueyanagi, 1962b
Yabe et al., 1963
Yabe, 1954
Yamanaka, 1966
Zharov and Zhudova, 1967
Zhudova, 1969a
Zhudova, 1969b

COLLECTION METHOD
Anonymous, 1970a
Anonymous, 1970b
Conand, 1970
Fisheries Agency, Japan, 1964
Fisheries Agency, Japan, 1966
Fisheries Agency, Japan, 1970b
Hayasi et al., 1970
Klawe, 1958
Nakamura, 1959
Nakamura and Matsumoto, 1966
Richards, 1969a
Sette et al., 1954
Strasburg, 1960
Ueyanagi, 1967b
Ueyanagi et al., 1969b

GENERAL BIOLOGY
Anonymous, 1970a
Anonymous, 1970b
Blackburn, 1965
Conand, 1970
Fisheries Agency, Japan, 1964
Fisheries Agency, Japan, 1970a
Hayasi et al., 1970
Klawe et al., 1970
Matsumoto, 1960
Matsumoto, 1966a
Mori, 1970
Ochiai, 1965
Schaefer, 1961
Shirota, 1970
Strasburg, 1959
Ueyanagi, 1967b
Ueyanagi, 1968b
Ueyanagi, 1969c
Yamanaka, 1966
Zhudova, 1969a

JUVENILES

DESCRIPTION
Anonymous, 1970a
Anonymous, 1970b
Bellón, 1954b
Greenhood, 1952
Jones and Kumaran, 1964
Jones and Silas, 1960
Kagoshima Prefectural Fisheries Station, 1926
Kagoshima Prefectural Fisheries Station, 1927
Kishinouye, 1919
Kishinouye, 1924
Kishinouye, 1926
Klawe, 1959
Klawe and Shimada, 1959
Marchal, 1963a
Marchal, 1963b
Matsubara, 1955
Matsumoto, 1961
Mead, 1951
Mimura et al., 1963a
Nakamura and Kikawa, 1966
Ochiai, 1965
Postel, 1962

Postel, 1964
Rossignol and Repelin, 1962
Schaefer and Marr, 1948a
Schaefer et al., 1963
Ueyanagi and Watanabe, 1962
Wade, 1950
Wade, 1951
Watson and Mather, 1961
Yabe et al., 1958

DISTRIBUTION
Anonymous, 1970a
Anonymous, 1970b
Ashmole and Ashmole, 1967
Ashmole and Ashmole, 1968
Bellón, 1954b
Bini, 1952
Clemens, 1955
Fisheries Agency, Japan, 1966
Gorbunova, 1965c
Hayasi et al., 1970
Higgins, 1967
Higgins, 1970
Idyll and de Sylva, 1963c
Klawe, 1963
Klawe and Shimada, 1959
Marchal, 1963a
Matsumoto, 1961
Mead, 1951
Mimura et al., 1963a
Nakamura, 1959
Nakamura, 1965
Ochiai, 1965
Parin, 1968
Schaefer, 1948
Schaefer, 1958
Schaefer, 1959
Schaefer, 1960
Schaefer and Marr, 1948a
Schaefer et al., 1963
Ueyanagi, 1966b
Ueyanagi, 1967b
Ueyanagi and Watanabe, 1962
Wade, 1950
Wade, 1951
Yabe et al., 1958
Yabe et al., 1963
Yamanaka, 1966

COLLECTION METHOD
Anonymous, 1970a
Anonymous, 1970b
Clemens, 1955
Fisheries Agency, Japan, 1966
Hayasi et al., 1970
Inoue et al., 1967
Nakamura, 1959
Schaefer and Marr, 1948a
Ueyanagi, 1965
Ueyanagi, 1967b
Yabe et al., 1953
Yabe et al., 1958

GENERAL BIOLOGY
Anonymous, 1970a
Anonymous, 1970b
Bini, 1952
Hayasi et al., 1970
Higgins, 1970
Inoue et al., 1967
Mimura et al., 1963a
Nakamura, 1965
Ueyanagi, 1965
Ueyanagi, 1967b
Yabe et al., 1953
Yamanaka, 1966

Thunnus atlanticus

EGGS

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
No references found

DISTRIBUTION
Gorbunova and Salabarría, 1967

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

JUVENILES

DESCRIPTION
Idyll and de Sylva, 1963b
Klawe, 1961a
Klawe and Shimada, 1959
Nakamura and Kikawa, 1966
Potthoff and Richards, 1970
Watson, 1962
Watson and Mather, 1961

DISTRIBUTION
Dragovich, 1970
Idyll and de Sylva, 1963b
Klawe, 1961a
Klawe and Shimada, 1959
Potthoff and Richards, 1970

COLLECTION METHOD
Potthoff and Richards, 1970

GENERAL BIOLOGY
Dragovich, 1970
Potthoff and Richards, 1970

Thunnus maccoyii

EGGS

DESCRIPTION
No references found

DISTRIBUTION
No references found

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
Nankai Regional Fisheries Research Laboratory, 1967
Ueyanagi, 1969a
Ueyanagi, 1969b
Ueyanagi et al., 1969a
Yabe et al., 1966

DISTRIBUTION
Chiomi, 1970
Far Seas Fisheries Research Laboratory, 1969
Nankai Regional Fisheries Research Laboratory, 1967
Ueyanagi, 1966b
Ueyanagi, 1969a
Ueyanagi, 1969b
Ueyanagi et al., 1969a
Yabe et al., 1966

COLLECTION METHOD
No refererces found

GENERAL BIOLOGY
Ueyanagi, 1969a

JUVENILES

DESCRIPTION
Nakamura and Kikawa, 1966
Yabe et al., 1966

DISTRIBUTION
Chiomi, 1970
Robins, 1963
Ueyanagi, 1966b
Yabe et al., 1966

COLLECTION METHOD
No references found

GENERAL BIOLOGY
Robins, 1963

Thunnus obesus

EGGS

DESCRIPTION
Anonymous, 1970a
Anonymous, 1970b
Kume, 1962
Mimura et al., 1963b
Mito, 1961

DISTRIBUTION
Anonymous, 1970a
Anonymous, 1970b
Gorbunova, 1965c
Mimura et al., 1963b

COLLECTION METHOD
Anonymous, 1970a
Anonymous, 1970b

GENERAL BIOLOGY
Alverson and Peterson, 1963
Anonymous, 1970a
Anonymous, 1970b
Kume, 1962
Mimura et al., 1963b
Nakamura and Hiyama, 1957

LARVAE

DESCRIPTION
Alverson and Peterson, 1963
Anonymous, 1970a
Anonymous, 1970b
Gorbunova, 1963
Gorbunova, 1965b
Jones and Kumaran, 1964
Kume, 1962
Matsumoto, 1962
Matsumoto, 1966b
Mimura et al., 1963b
Mito, 1961
Nankai Regional Fisheries Research Laboratory, 1967
Ueyanagi, 1966a
Ueyanagi, 1969b
Ueyanagi and Watanabe, 1964
Ueyanagi et al., 1963
Ueyanagi et al., 1969a
Yabe et al., 1963
Zharov and Zhudova, 1967
Zhudova, 1969a
Zhudova, 1969b

DISTRIBUTION
Alverson and Peterson, 1963
Anonymous, 1970a
Anonymous, 1970b
Barthélémy-Lefèvre, 1955
Far Seas Fisheries Research Laboratory, 1969
Fisheries Agency, Japan, 1970b
Fursa, 1969
Gorbunova, 1963
Gorbunova, 1965a
Gorbunova, 1965b
Gorbunova, 1965c
Gorbunova, 1966
Gorbunova and Salabarría, 1967
Hayasi et al., 1970
Matsumoto, 1962
Matsumoto, 1966a
Mimura et al., 1963b
Mori, 1970
Nakamura and Matsumoto, 1966
Parin, 1968
Richards, 1967
Richards, 1969a
Richards, 1969b
Richards et al., 1969a
Richards et al., 1969b
Richards et al., 1970
Ueyanagi, 1967a
Ueyanagi, 1967b
Ueyanagi, 1968b
Ueyanagi, 1969b
Ueyanagi, 1969c
Ueyanagi et al., 1969a
Ueyanagi et al., 1969b
Zharov and Zhudova, 1967
Zhudova, 1969a
Zhudova, 1969b

COLLECTION METHOD
Fisheries Agency, Japan, 1970b
Nakamura and Matsumoto, 1966
Richards, 1969a
Ueyanagi, 1967b
Ueyanagi et al., 1969b

GENERAL BIOLOGY
Anonymous, 1970a
Anonymous, 1970b
Hayasi et al., 1970
Kume, 1962
Matsumoto, 1966a
Ueyanagi, 1968b
Ueyanagi, 1969c
Zhudova, 1969a

JUVENILES

DESCRIPTION
Jones and Silas, 1960

Mimura et al., 1963b
Nakamura and Kikawa, 1966
Postel, 1962
Postel, 1964
Rossignol and Repelin, 1962
Ueyanagi and Watanabe, 1962
Yabe et al., 1958

DISTRIBUTION
Alverson and Peterson, 1963
Gorbunova, 1965c
Hayasi et al., 1970
Higgins, 1967
Higgins, 1970
Mimura et al., 1963b
Nakamura, 1959
Ueyanagi, 1967b
Ueyanagi and Watanabe, 1962
Yabe et al., 1958
Yabe et al., 1963

COLLECTION METHOD
Anonymous, 1941
Nakamura, 1959
Ueyanagi, 1965
Ueyanagi, 1967b
Yabe et al., 1958

GENERAL BIOLOGY
Hayasi et al., 1970
Higgins, 1970
Kishinouye, 1917
Marukawa, 1939
Mimura et al., 1963b
Ueyanagi, 1965

Thunnus thynnus

EGGS

DESCRIPTION
Altan, 1957b
Anonymous, 1970a
Anonymous, 1970b
Bănărescu, 1964
Bellón, 1954a
Bigelow and Schroeder, 1953
Heldt, 1926
Heldt, 1934
Mito, 1961
Oven, 1959
Padoa, 1956
Parona, 1919
Sanzo, 1909a
Sanzo, 1910
Sanzo, 1929
Sanzo, 1932b
Tiews, 1963
Vodianitskii, 1936
Vodianitskii and Kazanova, 1954
Yamanaka et al., 1963

DISTRIBUTION
Akyüz and Artüz, 1957
Bigelow and Schroeder, 1953
Devedjian, 1926
Gorbunova, 1965c
Parona, 1919
Rivas, 1954
Tiews, 1963

COLLECTION METHOD
Anonymous, 1970a
Anonymous, 1970b

GENERAL BIOLOGY
Bellón, 1954a
De Buen, 1935
Oven, 1959
Rivas, 1954
Sanzo, 1909a

LARVAE

DESCRIPTION
Altan, 1957b
Anonymous, 1970a
Anonymous, 1970b
Bănărescu, 1964
Bellón, 1954a
Bini, 1968
Dieuzeide, 1951
Ehrenbaum, 1924
Gorbunova, 1965b
Heldt, 1926
Heldt, 1934
Jones and Kumaran, 1964
Kazanova, 1962
Matsumoto, 1962
Matsumoto, 1966b
Mito, 1961
Nakamura, 1959
Nankai Regional Fisheries Research Laboratory, 1967

Ochiai, 1965
Oven, 1959
Padoa, 1956
Parona, 1919
Postel, 1964
Sanzo, 1909a
Sanzo, 1929
Sanzo, 1932b
Scaccini, 1967b
Scaccini, 1968
Sella, 1924
Shirota, 1970
Tiews, 1963
Ueyanagi, 1966a
Ueyanagi and Watanabe, 1964
Ueyanagi et al., 1969a
Vodianitskii, 1936
Vodianitskii and Kazanova, 1954
Yabe and Ueyanagi, 1962a
Yabe and Ueyanagi, 1962b
Yabe et al., 1963
Yabe et al., 1966
Yamanaka et al., 1963

DISTRIBUTION
Akyüz and Artüz, 1957
Anonymous, 1970a
Anonymous, 1970b
Bellón, 1954a
Bigelow and Schroeder, 1953
Dieuzeide, 1951
Far Seas Fisheries Research Laboratory, 1969
Gorbunova, 1965b
Gorbunova, 1965c
Gorbunova, 1966
Gorbunova and Salabarría, 1967
Hattori, 1965
Kazanova, 1962
Masuda, 1963
Matsumoto, 1962
Matsumoto, 1966a
Mori, 1970
Nakamura, 1959
Postel, 1962
Richards, 1967
Richards, 1969a
Richards et al., 1969a
Richards et al., 1970
Rivas, 1954
Tiews, 1963
Ueyanagi, 1966b
Ueyanagi, 1967a
Ueyanagi, 1969b
Ueyanagi et al., 1969a
Yabe, 1954
Yabe and Ueyanagi, 1962a
Yabe and Ueyanagi, 1962b
Yabe et al., 1963
Yabe et al., 1966
Yamanaka et al., 1963

COLLECTION METHOD
Nakamura, 1959
Richards, 1969a
Sella, 1924

GENERAL BIOLOGY
Anonymous, 1970a
Anonymous, 1970b
Bellón, 1954a
Masuda, 1963
Matsumoto, 1966a
Ochiai, 1965
Oven, 1959
Rivas, 1954
Sanzo, 1909a
Shirota, 1970
Tracy, 1907
Ueyanagi, 1969b
Yabe et al., 1966

JUVENILES

DESCRIPTION
Anonymous, 1970a
Anonymous, 1970b
Bellón, 1954a
Bini, 1968
De Buen, 1932
Dieuzeide and Roland, 1955
Fowler, 1944
Heldt, 1926
Heldt, 1932a
Heldt, 1932b
Jones and Silas, 1960
Kishinouye, 1919
Kishinouye, 1923
Klawe, 1959
Nakamura and Kikawa, 1966
Padoa, 1956
Parona, 1919
Potthoff and Richards, 1970
Sanzo, 1910

Scaccini, 1961b
Sella, 1924
Tiews, 1963
Ueyanagi and Watanabe, 1962
Watson, 1964
Watson and Mather, 1961
Yabe et al., 1966

DISTRIBUTION
Anonymous, 1970a
Anonymous, 1970b
Bigelow and Schroeder, 1953
Dieuzeide and Roland, 1955
Fowler, 1944
Furnestin et al., 1958
Gorbunova, 1965c
Heldt, 1928
Heldt, 1930
Heldt, 1932b
Parona, 1919
Potthoff and Richards, 1970
Rivas, 1954
Sarà, 1967a
Sarà, 1967b
Scaccini, 1961c
Scaccini, 1961d
Tiews, 1963
Ueyanagi, 1966b
Yabe et al., 1966
Yamanaka et al., 1963

COLLECTION METHOD
Fisheries Agency, Japan, 1970a
Inoue et al., 1967
Potthoff and Richards, 1970
Sella, 1924
Yabe et al., 1953

GENERAL BIOLOGY
Anonymous, 1970a
Anonymous, 1970b
Fisheries Agency, Japan, 1970a
Furnestin and Dardignac, 1962
Inoue et al., 1967
Inoue et al., 1970
Potthoff and Richards, 1970
Rivas, 1954
Scaccini, 1961d
Tiews, 1963
Yabe et al., 1953
Yabe et al., 1966

Thunnus tonggol

EGGS

DESCRIPTION
No references found

DISTRIBUTION
Gorbunova, 1965c

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

LARVAE

DESCRIPTION
Jones and Kumaran, 1964
Matsumoto, 1962
Matsumoto, 1966b
Richards, 1969a
Ueyanagi and Watanabe, 1964
Yabe et al., 1963

DISTRIBUTION
Gorbunova, 1965c
Matsumoto, 1962
Richards, 1969a

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

JUVENILES

DESCRIPTION
Jones and Silas, 1960
Nakamura and Kikawa, 1966

DISTRIBUTION
Gorbunova, 1965c

COLLECTION METHOD
No references found

GENERAL BIOLOGY
No references found

GPO 999-756

Predation by sculpins on fall chinook salmon, *Oncorhynchus tshawytscha*, fry of hatchery origin. By Benjamin G. Patten. February 1971, iii + 14 pp., 6 figs., 9 tables.

Number and lengths, by season, of fishes caught with an otter trawl near Woods Hole, Massachusetts, September 1961 to December 1962. By F. E. Lux and F. E. Nichy. February 1971, iii + 15 pp., 3 figs., 19 tables.

Apparent abundance, distribution, and migrations of albacore, *Thunnus alalunga*, on the North Pacific longline grounds. By Brian J. Rothschild and Marian Y. Y. Yong. September 1970, v + 37 pp., 19 figs., 5 tables.

Influence of mechanical processing on the quality and yield of bay scallop meats. By N. B. Webb and F. B. Thomas. April 1971, iii + 11 pp., 9 figs., 3 tables.

Distribution of salmon and related oceanographic features in the North Pacific Ocean, spring 1968. By Robert R. French, Richard G. Bakkala, Masanao Osako, and Jun Ito. March 1971, iii + 22 pp., 19 figs., 3 tables.

Commercial fishery and biology of the freshwater shrimp, *Macrobrachium*, in the Lower St. Paul River, Liberia, 1952-53. By George C. Miller. February 1971, iii + 13 pp., 8 figs., 7 tables.

Calico scallops of the Southeastern United States, 1959-69. By Robert Cummins, Jr. June 1971, iii + 22 pp., 23 figs., 3 tables.

Fur Seal Investigations, 1969. By NMFS, Marine Mammal Biological Laboratory. August 1971, 82 pp., 20 figs., 44 tables, 23 appendix A tables, 10 appendix B tables.

Analysis of the operations of seven Hawaiian skipjack tuna fishing vessels, June-August 1967. By Richard N. Uchida and Ray F. Sumida. March 1971, v + 25 pp., 14 figs., 21 tables. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 - 35 cents.

Blue crab meat. I. Preservation by freezing. July 1971, iii + 13 pp., 5 figs., 2 tables. II. Effect of chemical treatments on acceptability. By Jurgen H. Strasser, Jean S. Lennon, and Frederick J. King. July 1971, iii + 12 pp., 1 fig., 9 tables.

Occurrence of thiaminase in some common aquatic animals of the United States and Canada. By R. A. Greig and R. H. Gnaedinger. July 1971, iii + 7 pp., 2 tables.

An annotated bibliography of attempts to rear the larvae of marine fishes in the laboratory. By Robert C. May. August 1971, iii + 24 pp., 1 appendix I table, 1 appendix II table. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 - 35 cents.

Blueing of processed crab meat. II. Identification of some factors involved in the blue discoloration of canned crab meat *Callinectes sapidus*. By Melvin E. Waters. May 1971, iii + 7 pp., 1 fig., 3 tables.

634. Age composition, weight, length, and sex of herring, *Clupea pallasii*, used for reduction in Alaska, 1929-66. By Gerald M. Reid. July 1971, iii + 25 pp., 4 figs., 18 tables.

635. A bibliography of the blackfin tuna, *Thunnus atlanticus* (Lesson). By Grant L. Beardsley and David C. Simmons. August 1971, 10 pp. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 - 25 cents.

636. Oil pollution on Wake Island from the tanker *R. C. Stoner*. By Reginald M. Gooding. May 1971, iii + 12 pp., 8 figs., 2 tables. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 - Price 25 cents.

637. Occurrence of larval, juvenile, and mature crabs in the vicinity of Beaufort Inlet, North Carolina. By Donnie L. Dudley and Mayo H. Judy. August 1971, iii + 10 pp., 1 fig., 5 tables. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 - Price 25 cents.

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